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VOLUME X

JANUARY, 1916

NUMBER 7

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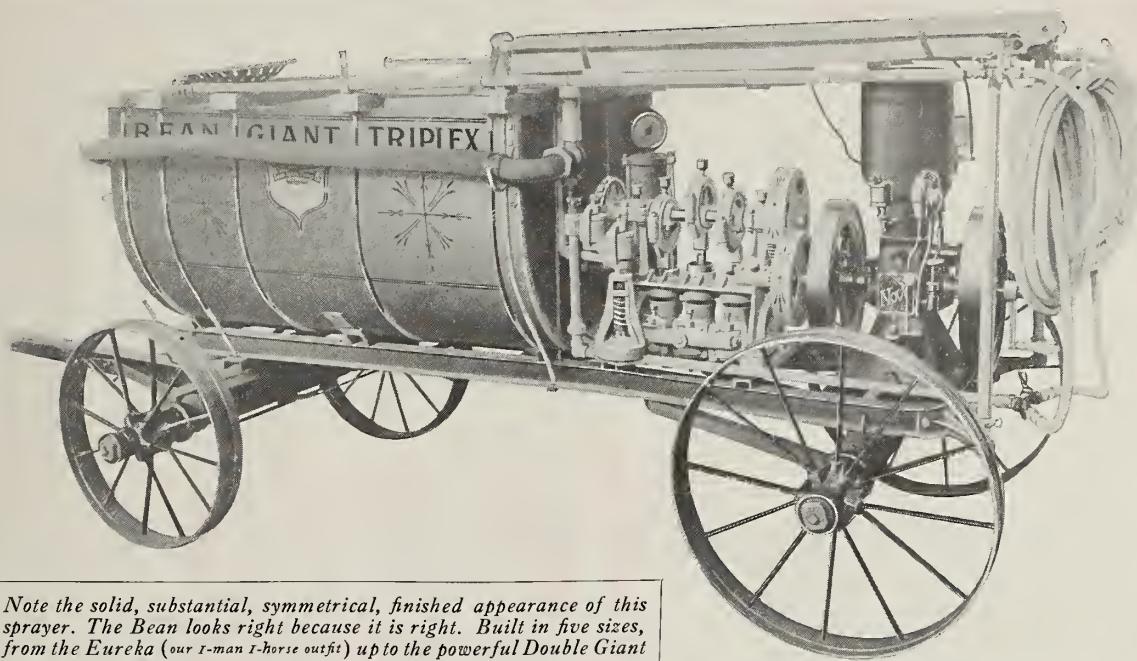


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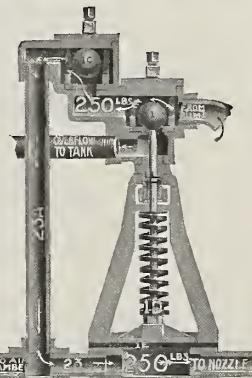
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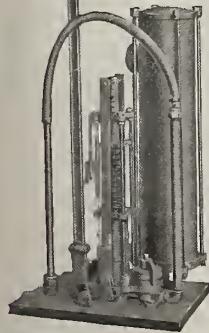
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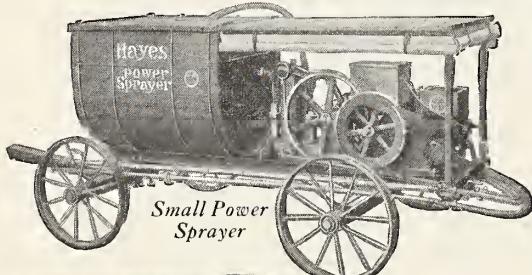
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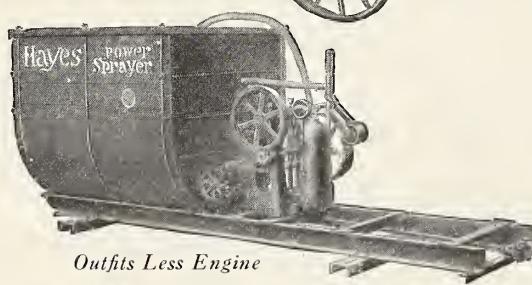
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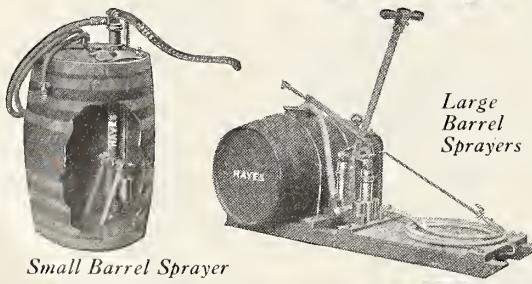
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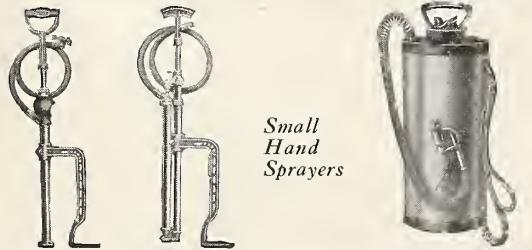
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BETTER FRUIT

AN ILLUSTRATED MAGAZINE PUBLISHED MONTHLY IN THE INTEREST OF MODERN, PROGRESSIVE FRUIT GROWING AND MARKETING

Some Horticultural Field Notes for the Season of 1915

By T. O. Morrison, Assistant State Commissioner of Agriculture, in charge of Division of Horticulture, Olympia, Washington.

CODLING MOTH SURVEY.—On September 20th, I began a codling moth survey of the districts of Wenatchee, Yakima, Kennewick, Walla Walla, Kettle Falls, Spokane, Clarkston and White Salmon to get in writing, as near as possible, the detailed operations of a large number of farmers as to their methods for codling moth control. It has taken a great deal of work and diplomacy on the part of the field inspectors to get these records, and a good many days and evenings, too, have been spent in the office studying and compiling this information. This season has been an almost unprecedented one for codling-moth injury. A great many farmers insist that the poor results in their arsenate sprayings this season are due to inferior lead arsenates. Personally I am of the opinion that the methods of application and the time of doing it have been more important factors than the chance of poor leads.

In making these summaries figures have been taken from surveys from all parts of the districts and it seems should represent fair averages. Not all of the orchards surveyed have been used in the general compilation, some being discarded on account of their location being between uncared-for orchards, or in isolated districts where infestation is not bad when no sprays are applied, or the orchard is young. The object was to get a fair summary which would show the average conditions where codling moth exists. The compilation of these surveys has been made usually by localities as the blanks were received, and in the case of the Yakima Valley three summaries have been made, one for the valley in general, one for the lower valley and one for the upper valley. In most localities our inspectors have placed codling moth breeding cages in order to observe the condition of the moths and determine spray dates. In this survey these spray dates are accepted as correct.

Fourteen orchards in the Grandview and Zillah districts having 455 acres of apples in bearing were tabulated. Of this number eleven were sprayed with power outfits and pressure ranging from 180 to 250 pounds before the calyx closed. Three were late in applying the calyx spray. Thirteen used the Bordeaux type of nozzle for the calyx spray. One used the Vermorel throughout the season. That the calyx spray was quite effective is shown by the calyx infestation at picking time, which averaged less than 1.34 per cent. There

were but three growers who repeated the calyx spray within ten days.

In spraying for the first brood of worms, seven were late in making the application, four were right, one early and two did not spray. For the second brood, eight were wrong, four were right and two did not spray. Three sprayed in August. The amount of lead averaged about two pounds per fifty gallons of water, and ranged from one to three pounds. At picking time

the average per cent for these fourteen orchards was 1.34% calyx wormy, and 27.6% side worms. Of these fourteen orchards five were clean cultivated, nine had cover crops of either alfalfa or clover. In eight of these orchards the spray for the first brood of worms was delayed until the crop of alfalfa could be cut and taken out of the way. One of the nine farmers did not allow the cover crop to delay spraying for the first brood. This



FIGURE 41—A five-year-old Yellow Newtown tree. It was pruned rather heavily each year until a year ago, when no winter pruning was afforded. When compared with Figure 43, a tree of the same variety and same age, it shows how light as opposed to heavy pruning tends to throw a tree into bearing. Note the many fruit-spurs on the two-year-old wood. During the preceding season a large part of the energies of the tree were devoted to fruit-spur formation.



FIGURE 42—A closer view of a portion of the top of the tree shown in Figure 41. It shows the tendency of unheaded shoots to develop large numbers of fruit spurs. Notice that a spur has developed from nearly every node on the two-year-old wood, and this in the top of a young tree of a variety normally slow in coming into bearing.

average per cent of infestation of side worms is 16.8%, and the average for the eight who delayed this spray is 31.1%. The number of moth sprays during the season averaged 3.5 applications. Six and seven-tenths (6.7) gallons per tree was the average for the fourteen orchards at each application.

At Wenatchee the inspector made a survey of 33 orchards with an acreage of 437½ acres. Of this number thirty sprayed before the calyx closed, using power outfits with pressure ranging from 175 to 250 pounds. There were three growers who repeated the calyx spray in ten days. For the 33 orchards the percentage of calyx worms at harvesting time was 2.2%. Three of these growers did not spray for the first brood of worms, twenty were right and ten wrong in the date of application.

For the second brood ten did not spray, seventeen were right and six wrong in the date of application. Seven sprayed during the first half of August. Mildew sprays were quite generally used during the season in combination with lead arsenate. Two farmers used atomic sulphur, one used Black Leaf 40, seventeen used iron sulphide and

nine used no materials in combination with lead. Of these orchards twenty-nine were sprayed throughout the season with Bordeaux type nozzles, eight were calyx sprayed with Bordeaux nozzles, and cone nozzles were used in later sprays. Four used Vermorel nozzles for all sprays. Six brands of lead were used at the average strength of 2.1 pounds per 50 gallons of water.

At picking time the average percentage for these thirty-three orchards was: calyx wormy 2.2% and 22.8% side worms. Of these orchards seventeen were clean cultivated and sixteen had cover crops. In seven of these orchards the spraying for first brood of worms was delayed until the crop of alfalfa could be cut and taken out of the way. Nine of these farmers did not allow the cover crop to interfere with the time of spraying for the first brood of worms. The number of moth sprays during the season averaged 2.9 applications per orchard. Five and four-tenths (5.4) gallons per tree per application was the average for the 33 orchards.

In making the following summaries, figures were taken from 79 orchards in

all parts of Yakima County, from the Selah and Naches to Grandview. Some orchards on which records had been taken were not used in the summaries for obvious reasons. One or two were discarded because, on account of their location, surrounded as they were by uncared-for orchards, they could with the utmost difficulty be kept clean, even with the most efficient sprayings. Some of the orchards in the upper Selah Valley and on Tieton Ridge were discarded because they were young orchards, surrounded either by other young orchards or isolated so that even with no spraying they could not be as bad as some other orchards in less favorable locations would be with several sprays. The object was to get a fair summary which would show the average conditions where codling moth exists. From my own observations as well as from the figures obtained, I am positive that the chief reason for the unsuccessful work of the growers of the Yakima Valley is, first, lack of thoroughness in spraying, the second failure to spray at the right time:

CALYX SPRAY.

Used at the right time.....	75
Used too late.....	2

LATER SPRAYS.

Used at the right time.....	30
Used at the wrong time.....	48
Per cent of calyx worms where calyx spray was used at right time.....	0.6
Per cent of calyx worms where calyx spray was not used at right time.....	3.0
Per cent of side worms where later sprays were used at right time.....	5.1
Per cent of side worms where later sprays were used at wrong time.....	20.3
Per cent calyx worms where pressure was up to standard in calyx spray.....	0.7
Per cent calyx worms where pressure was too low in calyx spray.....	1.1

In these records the percentage of calyx worms is very low, but doubtless would have been considerably larger if there had been any way of computing the number of calyx worms in the apples which dropped and those that were taken off in the course of thinning.

Twenty-five orchards were surveyed in the Cashmere district, comprising 321.5 acres. Of this number twenty-one sprayed before the calyx cups closed, and four were late in applying this spray. Power outfits in each case were used and pressure ranged from 150 to 300 pounds. Two orchards were sprayed again within ten days of the calyx spraying. Six were right in spraying for the first brood of worms, eleven were wrong and eight did not spray. For the second-brood spray, four were right, seven were wrong and fourteen did not spray. Ten used iron sulphide and one Black Leaf 40 in combination with lead arsenate. Seven sprayed for moth during August. The average number of gallons per tree was 4.7. Twenty-four of these orchards were sprayed with Bordeaux type of nozzles and one used Vermorel for all sprays. Four used cone type of nozzles for later sprays. Four brands of lead were used at the average rate of 2.1 pounds per 50 gallons. At picking time this fall the average percentage of infection for the 25 orchards was: 2.02% of calyx wormy for fifteen orchards

with the remaining ten reported "almost none," and 21.2%, the average per cent of side infestation. Thirteen had cover crops and twelve were clean cultivated. Seven of the nine in cover crops were delayed in spraying for the first brood of worms on account of the crop.

In the lower part of the Yakima Valley survey was made of twenty orchards, comprising 688 acres. Three of these were sprayed too late for a good calyx spraying, the other seventeen spraying with good pressure while the calyx cups were open. But four repeated the calyx spray in ten days after first application. In spraying for the first brood of worms nine made the application at the proper time, according to the inspector's spray dates, eight were wrong and three did not spray. For the second brood of worms, six were right, nine were wrong and five did not spray. Six growers out of the twenty used sprays in combination with arsenate of lead. Six of the orchards were sprayed for moth in August. The amount of spray solution used at each application averaged 5.6 gallons per tree, of arsenate of lead solution of 1.9 pounds average strength per 50 gallons. The number of sprayings averaged three and one-fourth times during the season. At picking time an estimate of the amount of codling moth infestation averaged for the twenty orchards 1.34% calyx and 15.5% side-worm infestation. Cover crops of alfalfa, clover and vetch were grown in fourteen orchards and was the cause of some delay in spraying eight of these for the first brood of worms.

Codling-Moth Summary

To read over carefully the survey reports of the 181 orchards surveyed is sufficient to convince one of the great variety of conditions that apparently had some bearing on the general unsatisfactory results obtained this season from codling-moth sprays. It is doubtful if there is any one important point that would explain the cause, except possibly for a few orchards. After studying over these records I am all the more convinced that lack of uniformity in doing the work throughout the districts is the first general suggestion that I have to make as one of the causative factors. Practically all of these orchards were sprayed uniformly with high pressure before the calyx cups closed, and the average low percentage of calyx wormy apples is proof that the calyx spray certainly was effective. The very large percentage of infestation at the side of the apple and the lack of uniformity in applying the later sprays certainly leaves room for improvement. The harvesting of the cover crop, which is usually alfalfa, comes just at the time when the spray for the first brood of worms should be applied, and many farmers have allowed this to postpone spraying.

In many orchards the crop was relatively light and the spraying of such orchards was not always done as thoroughly as it possibly should have been



FIGURE 43—A five-year-old Yellow Newtown tree. It has been pruned rather heavily each year. Last year it received a light thinning out and a comparatively heavy heading back. When compared with Figure 41, a tree of the same variety and same age, it shows how heavy pruning tends to stimulate vegetative growth as opposed to fruit production. Note that there are comparatively few fruit spurs on the two-year-old wood. It has been made to devote its energies mainly to shoot formation

done. During the year 1914, the Wenatchee Valley growers used 323,333 pounds of lead, and only 242,277 pounds this season, which was hardly in proportion to the increase of bearing acreage and size of trees. The 1914 crop was heavy, and many wormy apples were allowed to rot in the orchards and around the packing houses, thus carrying over an unusually large number of moths. Usually a winter of alternate freezes and thaws is fairly disastrous to insect life unless well protected. Last winter was pretty cold, but was not a winter of alternate freezing and thawing. Observations made on the Sherman ranch in Fruitvale, near North Yakima, on March 31st, showed live codling-moth larvae under the tree bands. On April 2nd the inspector found live larvae under the bark of apple trees in the Euclid district. This would indicate that the extreme cold of last winter did not destroy many, if any, codling-moth larvae or pupae. During the first week of August of this year codling-moth eggs were in evidence throughout the

Yakima Valley, and were no doubt the cause of a large percentage of stung apples. The cause for this season's heavy infestation would seem to be the result of a series of conditions, beginning with the left-over wormy apples of the 1914 crop and continuing up to the 1915 picking season. Although it will not stand the test in every case, the grower who has carefully watched spray data, sprayed thoroughly and kept his apples protected with the poisonous film throughout the growing season has secured best results.

Pear Blight (*Bacillus Amylovorus*)

The dreaded pear-blight disease has been doing its work in certain districts of the state since 1910. The excitement and realization of its seriousness probably reached its zenith during the growing season of 1914. The feeling among the mass of the growers will naturally decline now, but the disease is the same serious malady and all efforts possible should be made to encourage uniform control methods throughout the orchard districts. The notes on blight during the past growing season are

given in part here in order that we may become better acquainted with the progress of the disease from early spring to the end of the growing season.

First Flow of Blight Exudate

On March 19th, a Spitzenberg tree at Grandview showed signs of fresh oozing of blight exudate. On March 23rd, fresh exudate was found on Winter Nelis and Bartlett pear trees in the Broadway district near North Yakima. On March 27th more exudate was observed on other pear trees in the Broadway locality, and on the same date the first exudate for the season at Sunnyside was observed on one Jonathan and one Bartlett tree, and four days later was found on a Spitzenberg tree. It was expected that new exudate would become noticeable in the lower valley first, where the season is one to three weeks in advance of the upper valley, but the temperature records for March for Yakima give a mean maximum of 61.8 degrees, and a mean minimum of 36.4 degrees, and for Sunnyside a mean maximum of 62.4 degrees and a mean minimum of 35.1 degrees, which no doubt had much to do with the regularity of appearance of first new ooze in those localities. On April 1st, first new exudate was seen in the Selah district on one pear tree and new case was found April 7th on the Selah Extension. On April 5th, the first new exudate found in the Clarkston district was noted, and on April 6th exudate was found on Bartletts in the Euclid district, near Grandview. As early as April 10th a small percentage of hold-over cankers found in the vicinity of North Yakima showed signs of exudations, and by the 24th of April a good percentage of hold-overs found showed exudate.

New Infection

The first new infection of the season was observed on Winter Nelis blossoms in the vicinity of North Yakima April 24th, and at Prosser on April 20th. At that date this variety had been in bloom only a few days, but where hold-overs were found it was not a difficult task as a rule to find new infection of blossoms on nearby trees. Whenever blight shows up in a district it seems that there are always certain varieties that show heavy percentages of blossom infection, while other trees of different varieties growing among them may show no blight, or at least blight in small proportion to their neighbors. Although there are many factors entering into the probable cause, my observations during a number of seasons lead me to think that the limitation of the blossoming period and its relation to the abundance of blight exudate at that time is an important factor in causing infection to take place in some varieties to a greater extent than in nearby trees of different varieties. Bartlett pears at North Yakima were coming into bloom April 9th, and on the same date were practically in full bloom throughout the Grandview district. The amount of exudate exposed to the visitation of insects at that date



FIGURE 44—A branch of a young Yellow Newtown tree. The lower (left hand) fork was headed back rather heavily, the upper (right hand) fork only moderately. From the upper one have developed three shoots and nine fruit spurs; from the lower one four shoots and three fruit spurs. The photograph shows that heading back, whether heavy or light, tends to increase the amount of shoot growth in the tree. However, heavy heading back is seen to afford a greater stimulus to shoot formation and less of a stimulus to spur formation than a more moderate heading back.

was very small as compared to the amount exposed ten days to two weeks later, when most varieties of apples were in bloom. It is a well-known fact that the amount of infection in the regular blooming season is much greater in Jonathan and Spitzenburgs than in Bartlett pears, and the above dates would partially seem to explain this point. Bartlett trees that throw out later bloom are very susceptible to blight, which is probably due, first, to the greater abundance of exudate, and, second, to temperature conditions.

Early in May new blight became easily noticeable to anyone looking carefully for signs of it. On May 8th, new blight was beginning to show up at North Yakima on Spitzenberg, Jonathan, Rome Beauty and some Winesaps. On May 12th, new blight was showing up quite generally on Spitzenburgs and Jonathans. In spite of the fact that pears had bloomed heavily they were less seriously affected, no doubt due to the blooming season of

the pears being a little ahead of any general activity in hold-over cankers. A warm rain on May 15th, which was quite general throughout the Yakima Valley, apparently accelerated and promoted the spreading of blight infection. This humidity continued for several days and a week later it was reported that some blight had shown up in practically all districts in Yakima County. As early as the 22nd of May the inspector assigned to the Selah district reported the finding of serious infection in Winesaps and Delicious. New blight was showing up plentifully in the vicinity of Walla Walla May 13th, and some new infection was observed by the middle of May in the vicinity of Dayton and Clarkston. Up to May 29th the new infection of Spitzenburgs and Jonathans was almost entirely fruit-spur infection, but Rome Beauties were beginning to show some tip infection. One interesting point was reported on May 20th to the effect that infection that had reached the base of fruit spurs

was apparently traveling faster across the limb than up and down the limb from the fruit spur.

The first new blight in the Wenatchee district was reported to have been found May 22nd and 29th in the Nahaham and Brender Canyons on Jonathans and Bartletts. Just why the amount of blight exudate was so small in the Wenatchee district and had the relatively small percentage of blossom infection I am unable to say, unless the difference in temperature conditions, as shown by the Weather Bureau's records, was a factor.

June and July were months of unusual blight activity in the districts

affected by blight. On June 16th, it was observed near North Yakima that blight was apparently making entrance at the base of leaf petioles, and on July 9th Dr. Hotson observed and later determined the presence of blight infection on the outer margins of pear leaves. On September 18th, the inspector reported observations of many invasions of the leaves in the Spokane district. The specimens were sent to Dr. Heald, plant pathologist at the State College, where it was reported for a certainty that the blight had made its entrance through the leaf apparently without the aid of insects or mechanical injury. In the Selah district blight

infection was observed on pear fruit on May 12th, which apparently became infected from the dripping of blight ooze. That drupaceous fruits may sometimes become infected with pear blight has been proven. On June 19th, the inspector found four young prune trees at College Place, near Walla Walla, infected with tip blight. Specimens were sent to Dr. Heald of the State College and he determined the infection to be that of ordinary pear blight. During June Dr. Hotson, at North Yakima, proved that cherry fruit could be inoculated with the pear blight organism and has cross-inoculated several times with Royal Ann tips.

Pruning the Bearing Apple and Pear Tree

By Professor V. R. Gardner, Oregon Agricultural College, Corvallis, Oregon.

IN presenting this subject it is assumed that the trees have been brought to bearing age. They have been trained as open-center, closed-center or modified-leader trees, as the case may be. They have been given their general shape and consequently little attention will need to be devoted to the question of training them. The little training that will be required will be incidental to the main problem of pruning to influence fruit production. After trees have been brought to bearing age there is little argument as to what the main objects of pruning should be. They are, first, to obtain large quantities of fruit, full yields for the size of the trees in question; second, to obtain better fruit, the best that can be grown under the conditions in question; third, to obtain these large yields and high grade at the lowest possible cost.

The Ideal Fruit-Spur System

As has already been pointed out in a previous article, the fruitgrower obtains the most of his fruit through the medium of fruit-spurs. In other words, fruit-spurs are the main fruiting mechanism, or main fruit-producing machinery of the trees. The questions, then, to consider are: What constitutes an ideal fruit-spur system and when is that fruit-spur system in an ideal producing condition. In the first instance we want many spurs. This does not mean, necessarily, the largest possible number of fruit-spurs for any given space, but we must have a great many or else we cannot obtain a large number of fruits, for ordinarily a single spur does not produce more than one high-grade fruit in one season. Frequently several fruits set on a single spur, but in the better-managed orchards these are thinned to one, which is allowed to mature. We want not only many spurs, but it is desirable that each spur be strong and vigorous. It seems reasonable that a strong, vigorous spur not only will produce better fruit than one which is weak, but it will also be more regular in its bearing; and regularity of bearing of individual fruit-spurs is as important from the viewpoint of annual yields as the

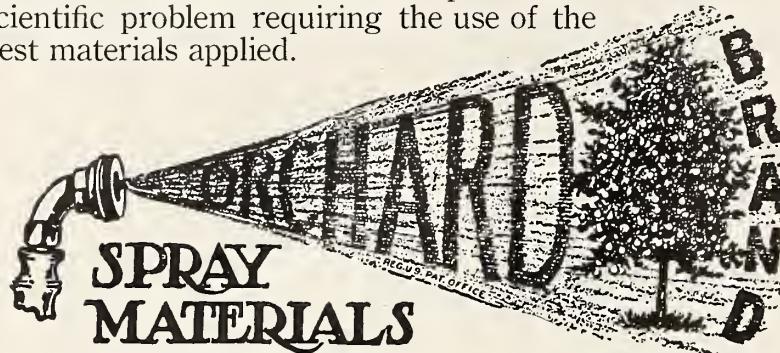
number of fruit-spurs present. A regularly bearing fruit-spur in the case of apples and pears is one that bears once in every two years. It cannot be expected to bear every year, for normally a fruit is produced from a terminal bud one season and the next season is required to prolong the spur from a lateral leaf bud so another terminal flower bud can be formed the follow-

ing year. The spur which bears in 1915 can reasonably be expected to bear again in 1917. However, the trouble with a large percentage of fruit-spurs, especially in older trees, is that they do not bear every other year. Instead they bear but once in three, four, five or, in some cases, eight or ten years. This irregularity of bearing generally is due to a lack of vigor on the part of



FIGURE 45—A young apple tree showing the effect of very heavy heading back. In this case the pruner cut back into two-year and three-year-old wood. Fruit spurs that had started to form were forced out into shoots. The entire energies of the tree have been temporarily turned into shoot formation. Age of bearing has probably been delayed two years by the treatment

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the individual spur, though perhaps the tree as a whole would be regarded as vigorous. The case is one of trees possessing fruit-producing machinery, but the machinery is in poor condition, unable to turn out its full quota of work.

Furthermore, we desire not only many and regularly bearing fruit-spurs, but they must be long-lived. Even if there are some spurs formed each year, and if these were to bear regularly for three or four seasons, the large bearing tree might soon come to have too little fruit-producing machinery for large yields if the spurs died when four or five years old. Furthermore, the rapid dying off of spurs in the older parts of trees would soon result, first, in a large amount of barren wood, and, second, in the clustering of the live spurs near the ends of the smaller branches, where the load of fruit can least easily be supported. Ordinarily the fruit-spur that lives for twenty years and produces ten fruits is twice as valuable as one that lives half as long and produces five fruits.

Influence of Pruning Practices Upon the Fruit-Spur System of the Tree

With the ideal fruit-spur system in mind, we are ready to ask these questions: How do pruning practices, as commonly employed upon bearing trees affect this mechanism for fruit production? What is their influence upon the formation, regularity of bearing and length of life of the individual fruit-spurs?

Light Heading Back vs. Heavy Heading Back

Pruning of bearing trees almost necessarily consists in one or another of two practices, heading back or thinning out, or in a combination of the two. In regard to heading back, two questions arise at once: First, what is its influence upon the number of fruit-spurs that will develop, and, second, what is its influence upon the length of life and regularity of bearing of already formed fruit-spurs? As heading back may be either light or heavy, and as we would naturally expect different results from a heavy than from a light pruning, let us first consider the probable effect of a light heading back. By light heading back we will assume that there is meant a thirty per cent cutting back of the shoot growth of the past season. This would mean that a shoot having ten equally-spaced lateral buds would have the upper three removed under ordinary circumstances. The probable effect of this light heading back would be that one to three, probably two, of the uppermost buds remaining would be forced out into shoots the following summer. Some of the lower buds, let us assume three, would be forced out into fruit-spurs; and still others, two, in the case that has been assumed as typical, would remain dormant. That these probable results of a light heading back may be more easily compared with the probable results of other types of pruning, let us multiply



FIGURE 46—The top of an old Tompkins King tree. Moderate pruning two and three years ago stimulated the formation of a rather large number of medium long shoots. These shoots have not been headed back and have consequently developed large numbers of fruit spurs. A number of these small spur-bearing branches should now be removed in order to afford those remaining an abundant supply of light throughout their length. Thinning out is more needed than heading back in this tree top, though a limited amount of heading back will tend to keep the tree from growing so high.

the figures by one hundred, giving us the growth record from one hundred shoots, each with ten lateral buds. (It is of course not imagined that any bearing tree would present exactly the conditions here assumed. The shoots of trees are not of uniform length; all do not respond in the same way, even though pruned back relatively the same amount. Many factors enter to cause individual variation and the pruner will, to a certain extent, take these factors into consideration, pruning one shoot heavily to check or subordinate it, another lightly to encourage it, etc. Nevertheless there seems to be no good reason for believing that our theoretical example of a tree with one hundred shoots, each shoot having ten equally-spaced lateral buds, would behave in a manner materially different from trees as we find them. Indeed, it is believed that on the average they would behave alike. It is only by taking theoretical cases of this sort that a simple comparison of results between different methods of pruning may be readily made.)

From the one hundred old shoots we would obtain two hundred new shoots, three hundred new fruit-spurs, and have left two hundred dormant buds. It would seem that the net result of a light heading back is practically to double the original number of shoots, and also to develop quite a large number of new fruit-spurs.

Next, let us see what results we may expect from a heavy heading back. By heavy heading back we will assume that there is meant the removal of the terminal sixty per cent of the shoot growth of the season. Again assuming a tree with one hundred shoots, each possessing ten equally-spaced lateral buds, heavy heading back would leave four hundred lateral buds on the shoot growth of the past season. The comparatively heavy heading that these shoots would receive would have a tendency to force out a large number of the buds left into shoot growth, thus leaving a smaller number for the development of the spurs and a still smaller number to remain dormant than in the case of light heading back. Probably a year's growth on the one hundred heavily pruned shoots would result in approximately two hundred and fifty new shoots, one hundred and fifty spurs—fifty buds remaining dormant.

Comparing the results from light with those of heavy heading back, it will be seen that both practices result in a great increase in the number of shoots and also a moderate increase in the total number of fruit-spurs. Of the two practices, heavy heading back affords the greater stimulus to vegetative growth, but less of a stimulus to spur formation.

Light Thinning Out vs. Heavy Thinning Out

A light thinning out of the theoretical tree (we are assuming a thinning out that is equal in the amount of growth removed to the light heading back) would leave seventy of the one hundred

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shoots, and these seventy shoots would not be pruned in any way. Each of these seventy shoots possesses not only ten equally-spaced lateral buds, as was

assumed before, but a terminal bud as well. When growth begins in the spring the terminal buds are usually the first to start, and it is a matter of



FIGURE 47—An old Bartlett pear tree that has become filled with much-branched fruit spurs. Many of these spurs are very weak and lacking in vigor and produce flowers and fruit very irregularly, only once in five and ten years.



FIGURE 48.—An old Bartlett pear tree that several years ago was in the condition of that shown in Figure 47. An attempt was made to reinvigorate its old weak spurs by "dehorning," a very heavy heading back of the top part of the tree. The result has been the formation of a large number of strong, vigorous shoots that in turn have developed many vigorous fruit spurs. However, the old spurs in the lower part of the tree have remained much as they were. They have not been invigorated to any marked extent. Thinning out instead of heavy heading back would probably have afforded very different results.

common observation that the main shoot growth of the season, in trees with non-headed shoots, develops from these terminal buds. In fact comparatively few of the lateral buds develop into shoots, most of them starting but only growing out into spurs. Were we to assume that from seven hundred and seventy buds, seven hundred lateral and seventy terminal, on the seventy shoots remaining after a light thinning, we obtain one hundred and forty shoots and four hundred and ninety spurs, leaving one hundred and forty dormant buds, we would probably not come far from what would be actually obtained.

A heavy thinning out of this same theoretical tree we are considering, a thinning out that would remove sixty per cent of the shoot growth of the season, would leave forty untouched shoots. Each of these would have a terminal bud and ten equally-spaced lateral buds, and would probably behave the following season in much the same manner as the unpruned shoots

of the lightly-thinned tree. Were this the case the result would be eighty new shoots (forty from the terminal buds and forty from as many lateral buds), about three hundred and twenty spurs and forty dormant buds. The individual shoots might be longer and stronger, and the individual spurs thicker and more vigorous in appearance, but probably the proportion of buds to develop into fruit-spurs would remain about the same.

When the results to be expected from a light thinning out are compared with those to be expected from a heavy thinning out, it is seen that the light thinning affords a larger number of both spurs and shoots, though it is reasonable to assume that the shoots will be shorter and the spurs somewhat less vigorous than those of the heavily thinned trees.

That the probable effects of these different pruning practices may be more readily compared, they are presented in tabular form:

TABLE II.—SHOWING PROBABLE RESULTS FROM DIFFERENT METHODS OF PRUNING ONE HUNDRED SHOOTS, EACH HAVING TEN EQUALLY SPACED LATERAL BUDS.

	Light (30%) heading back	Heavy (60%) heading back	Light (30%) thinning out	Heavy (60%) thinning out
Number terminal buds left.....	0	0	70	40
Number lateral buds left.....	700	400	700	400
Number new shoots formed.....	200	250	140	80
Number new spurs formed.....	300	150	490	320
Number buds remaining dormant	200	50	140	40

Heading Back vs. Thinning Out

If the results from heading back are compared with those from thinning out, it becomes evident that both processes tend to stimulate the formation of both new shoots and new fruit-spurs. However, heading back affords the greater stimulus to fruit-spur formation. This is true whether it is light heading back and light thinning out or heavy heading back and heavy thinning out that are being compared.

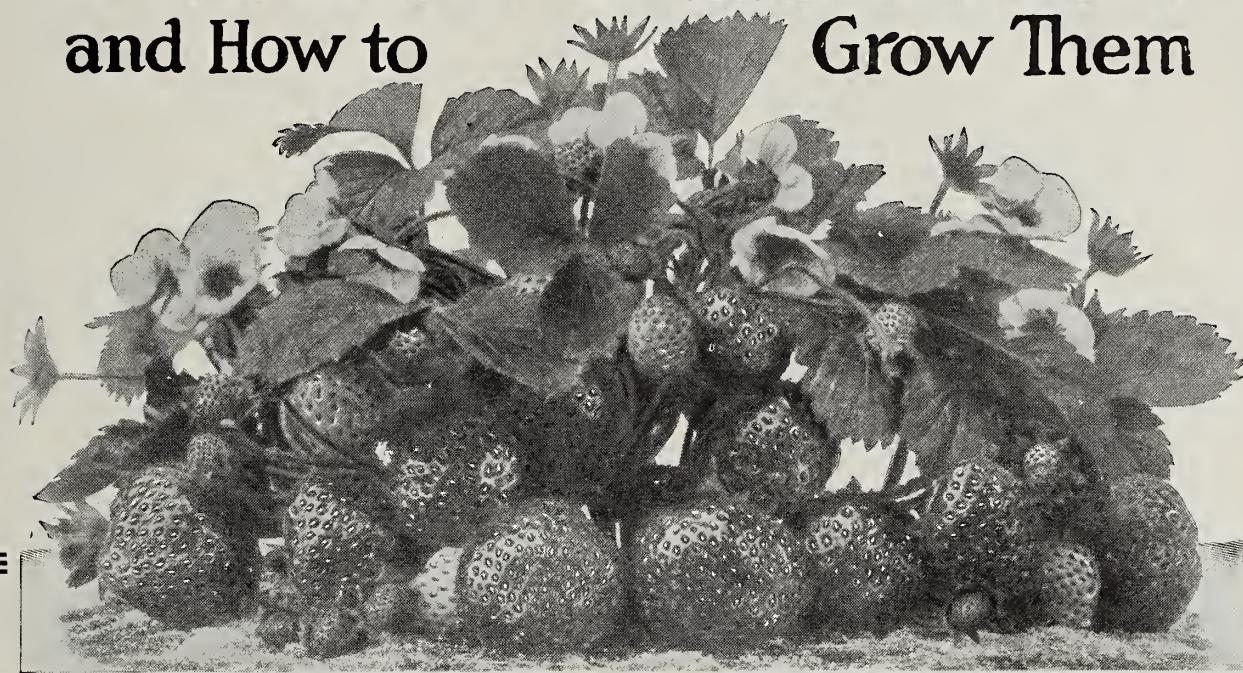
What has just been said regarding the influence of different pruning practices upon the formation of new fruit-spurs applies with almost equal force to their influence upon the longevity and regularity of bearing of already-formed fruit-spurs. It might be reasoned that heading back in general, and especially heavy heading back, because of its limiting the formation of new fruit-spurs, would tend to divert food material into those already formed and cause them to be more vigorous, more long-lived, more regular in bearing. On the other hand, heading back seems to show a tendency to divert food material into new shoots rather than the old spurs. These new shoots develop mainly in the outer and upper parts of the tree, leaving the spurs in the lower and inner portion in a weakened condition. The result is that they will probably bear less regularly and die earlier than spurs which have an abundant food supply. Furthermore, very heavy heading back will even force into shoot growth some of the already-formed spurs.

Thinning out, on the other hand, will not only divert an extra amount of food material into the older fruit-spurs on account of its reduction of shoot growth, but it also lets light into the center of the trees, so that the leaves of each spur are better able to manufacture the food materials needed to keep these spurs vigorous and thrifty. This should enable them to live longer and bear more regularly. Light thinning out probably affords the larger number of fruit-spurs, and heavy thinning out the stronger, more vigorous and long-lived ones.

Continued in next issue

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The exhibit was always a center of interest for visiting fruit growers, and representatives of the company were kept constantly busy explaining the various Bean features and demonstrating the different outfits.

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The Bean Spray Pump Company has just issued a complete new catalog, the largest and finest book of its kind ever issued by this firm. It is profusely illustrated and embraces the complete Bean line, from the smallest hand pump up to the new Double Giant. The catalog will certainly be of interest to every fruit grower, and a copy will be mailed to all who address the Bean Spray Pump Company at San Jose, California.

This article would not be complete without mention of the new, finely equipped offices and stockroom that have replaced that portion of the Bean plant at San Jose which was destroyed by fire several months ago. Before the ashes were cold plans were under way for reconstruction, and the burned structure has been replaced with one considerably larger and better. It is a notable fact that the fire, though of considerable extent, did not seriously delay deliveries of the company's products; that part of the factory unharmed having been put into operation within twelve hours after the fire. The plant is now protected by a modern sprinkling system, and a repetition of the disaster is practically impossible. The rebuilt plant is one of the most convenient and efficiently equipped of its kind to be found anywhere.

Herewith we show a view of the exhibit made at the Panama-Pacific Exposition by the Bean Spray Pump Company, of San Jose, California, and Lansing, Michigan.

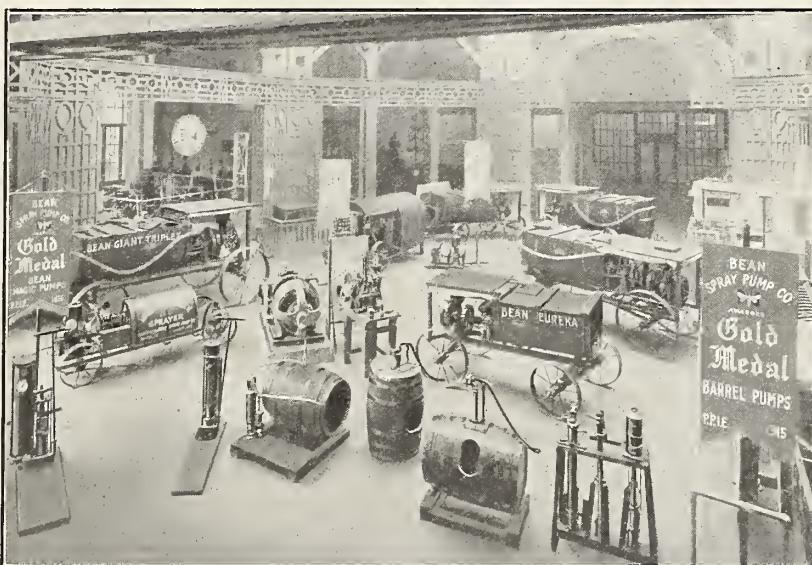
The grand prize, the highest award in the hands of the international jury, was given to the Bean power sprayers. In addition to the grand prize the concern received a number of gold medals and other awards.

The Bean Spray Pump Company is well and favorably known throughout the Northwest as manufacturers of spraying outfits, and this recognition of

superiority by the exposition judges will not be a surprise to those who are familiar with the high-grade outfits that are put out by the Bean factory.

The central feature of the display was a beautiful waterfall, the water being carried to the top of the falls by a Bean pump, and rushing down over the rocks in foaming cascades, it was returned to the reservoir, from which it was again pumped to the falls. Three different outfits were rigged up for pumping the water: a 10-h.p. Bean engine direct connected to a 4-inch Bean pump; a 5-h.p. motor direct connected

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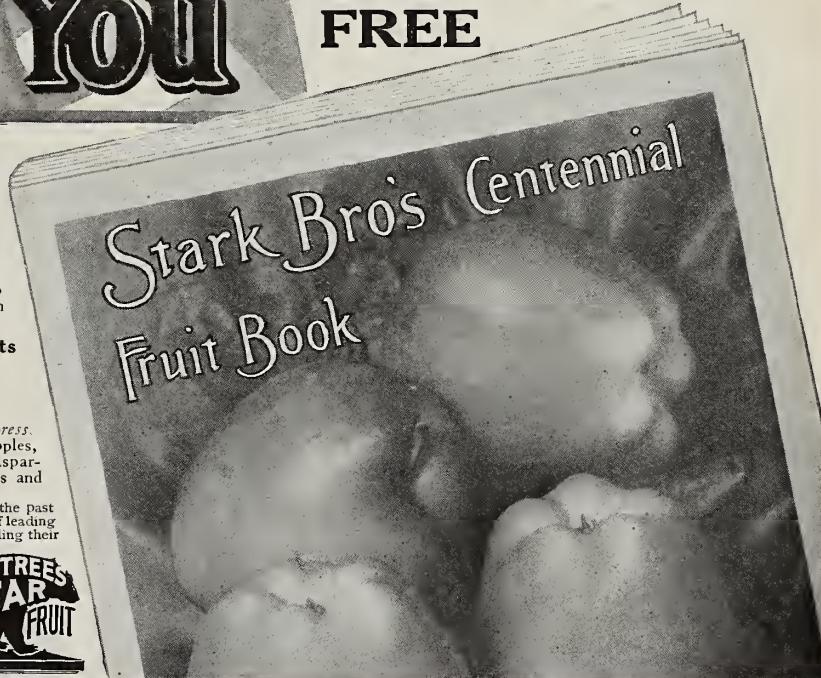
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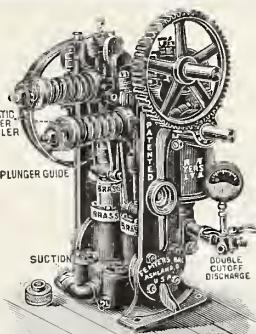
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ELIMINATES PRESSURE TROUBLE**



Myers Power Spray Outfits are made in various sizes, with pumps for belt, gear or pitman drive. All will operate successfully under any conditions and give entire satisfaction. You can bank on that. Myers Bucket and Barrel Sprayers and Hand Outfits are unusually well constructed. Built with the Myers Patented Cog Gear Head, they are so easily operated that they can be used where other styles could not even be considered. In fact they possess that something in superior quality and construction that can not be found elsewhere.

Our Sales Catalog will tell you all about modern spraying machinery and also how and when to spray. Write for a copy today.

IT WILL SOON
BE TIME
TO SPRAY



**F. E. MYERS & BRO.
ASHLAND, OHIO.**
ASHLAND PUMP AND HAY TOOL WORKS
120 ORANGE STREET

How Spray Kills

By Dr. A. L. Melander, Entomologist, Head of Department of Zoology, Washington State College.

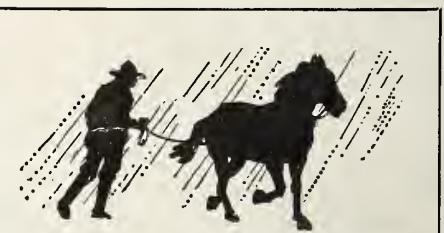
SPRAYS that are used to control insects do not all work alike. Those containing arsenicals must be eaten by the insect in order to destroy. Others, like oil emulsions, tobacco and sulphur-lime, kill when in contact with the insect's body, by a process of suffocation. Some sprays have a disagreeable taste and prove effective as a repellent, rather than as a poison, the insects going hungry rather than to eat the bad-tasting spray. It is the repellent action of sprays that is little understood, much neglected, but nevertheless most important. Bordeaux spray, sulphur-lime, tobacco, oil emulsions, soaps and lime, our commonest spray materials, are all repellents to chewing insects. This should be borne in mind when compounding mixtures of several sprays. It is not alone the chemical reaction that must be heeded in combining sprays, nor also the possibility of foliage injury, but the physiological reaction on the insect must be considered as well. A newly-hatched codling worm is a delicate

little creature. It has a selective appetite and does prefer to feed within the pulpy calyx end instead of on the tough skin of the apple. If its first meal is distasteful, the young codling worm has been seen to reject it, working the nibblings out of its mouth by a secretion of silk. This is probably always the case where the apple is heavily coated with arsenate of lead, or where lime, bordeaux spray or sulphur-lime have been added to the poison. Thus it is that late sprayings lack effectiveness, even when the fruit is whitened by the spray. Most of the entering worms manage to swallow some of the poison, however, enough to kill them after a few days, but in the meantime the apple is "stung," the worm penetrates a short distance and the fruit becomes as valueless as if it were badly wormy. Apples "stung" at the calyx end are rare when plain, weak arsenate of lead alone is used. It is easily conceivable that a calyx spray, much stronger than one or two pounds to the fifty gallons, would prove increas-

ingly less effective, and evidence seems actually to point this way. Calyx worminess is customary where the dust spray, a lime spray or a combination with fungicide is used.

An insect's sense organs are very different from our own. Its tasting is done by little finger-like appendages, which vary in structure with the species. Things distasteful to us are not necessarily shunned by insects. For instance, ants will eat quinine but will reject glycerine, and flies will drink formaldehyde until they drop dead. Bordeaux spray is highly distasteful to most grasshoppers, leaf-eating beetles and cutworms, but there are some cutworms on which it seems to have no effect. An insect is not a feeding machine that must scrape off and swallow whatever is on its food. It is a living organism gifted with powers of discrimination keener than any we possess. We have but to recall how certain insects are restricted to certain food plants, displaying a knowledge of plant species more astute than that of a professional botanist. The least we can ask, therefore, of a stomach poison is that it shall be tasteless and fine grained, so that the insect

Continued on page 28



Harness is like a leather boot—if you don't keep it oiled, it rots. Moisture that works into the pores of your harness robs tugs, straps and breechings of the strength they need to give you good long service.

EUREKA HARNESS OIL

keeps the pores of the leather filled with highly waterproof oils—keeps your harness soft, pliable, strong. Have your harness man dip your harness occasionally, or apply it yourself by hand. Harness costs money. It doesn't pay to neglect it.

**Standard
Oil
Company
(California)**

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R. J. Reynolds Tob. Co.



Prince Albert paves the way

for men to get a new and cheerful understanding of how good a pipe or rolled cigarette can be. If you *think* you can't smoke a pipe or a makin's cigarette; if you are taste-tired, we tell you Prince Albert will bring you back without any fuss or feathers—quick! The patented process fixes that—and cuts out bite and parch!

PRINCE ALBERT

the national joy smoke

has everything any man ever yearned for in a pipe or rolled cigarette. Its flavor is as refreshing as it is delightful; and its aroma, coolness and non-biting qualities will certainly make you realize you have lost a lot of good old smoking time!

Don't *think* about this tobacco question any longer. *Decide now* you will try Prince Albert! Just you see for yourself that all the good things we say about P. A. will more than prove out to your tongue and taste!

Buy Prince Albert everywhere tobacco is sold in toppy red bags, 5c; tidy red tins, 10c; pound and half-pound tin humidors and in that classy pound crystal-glass humidor with sponge-moistener top that keeps the tobacco in such fine trim.

R. J. REYNOLDS
TOBACCO CO.

Winston-Salem, N. C.



BETTER FRUIT

HOOD RIVER, OREGON

Official Organ of The Northwest Fruit Growers' Association
 A Monthly Illustrated Magazine Published in the
 Interest of Modern Fruit Growing and Marketing
 All Communications Should Be Addressed and Remittances
 Made Payable to

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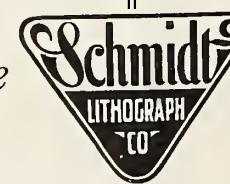
ADVERTISING RATES ON APPLICATION

Entered as second-class matter December 27, 1906, at the
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 of Congress of March 3, 1879.

A National Advertising Campaign for the Northwest.—During the National Apple Show an idea was presented to the Northwest, consisting of the States of Washington, Idaho, Oregon and Montana, of engaging in a general advertising campaign, for the purpose of advertising the Northwestern box apples. The suggestion was made that it would be advisable for the growers to consider such a proposition, and it was also stated that if such a proposition was undertaken that one cent per box would be required in order to raise a fund sufficient for anything in the way of a national campaign. It was stated at the Conference in Spokane that this suggestion would give the apple growers throughout the Northwest an opportunity for studying and discussing the plan among themselves, it being the intention later to present something definite in the way of a plan at a meeting of the Fruit Growers' Council, which will probably take place in the month of January. Various opinions and ideas exist in different districts and even among fruit growers in the individual districts. It is the view of some that each district should spend its own money to advertise its own particular brands, while it is the view of others that if a large percentage of the growers would contribute one cent a box an increased sale for Northwestern box apples could be created, the distribution widened and the markets extended. There are a great many districts in the Northwest which so far have failed to get together and all agree on any one plan. Many ideas have been advanced, a great many of which have cost money without realizing any better prices for the grower. Such are some of the expressions of opinion of the different growers in different districts. The plan

Selling is your Salvation

You must sell
 at a profit
 or
 quit the game



Well dressed
 packages
 attract
 attention
 —
 Induce sales

OUR ATTRACTIVE LABELS
 ARE YOUR SILENT SALESMEN

SCHMIDT LITHOGRAPH CO.
 SAN FRANCISCO.

Los Angeles, Fresno, Portland, Seattle, Salt Lake City

as suggested calls for a committee to be composed of one representative chosen by the Chamber of Commerce of Spokane, one representative to be chosen by the Chamber of Commerce of Seattle, and one representative to be chosen by the Commercial Club of Portland, it being intended that this committee should go into the matter in detail and work out a definite plan of advertising and superintend all expenditure of the advertising appropriation. At the present time, from the various opinions expressed and the various attitudes of the different growers and marketing

purpose. And even so, it must be admitted that some individuals and a large percentage of some districts will even then be unwilling, feeling that they can spend their own money best in their own way. The Sellers' League, composed of representatives of the different selling concerns, met in conference in North Yakima to consider this and other important matters, the third week in December, without arriving at any definite conclusion, finally agreeing before making any definite recommendation to await the result of the survey of the apple industry that is being made in the Northwest by government officials. This is simply a general statement of the attitude, opinions, problems and accomplishments up to the present time in reference to the contribution of one cent per box for the national advertising campaign.

“*Better Fruit*”
 wishes
 Every Subscriber
 and
 Every Advertiser
 A Happy and Prosperous
 New Year for 1916

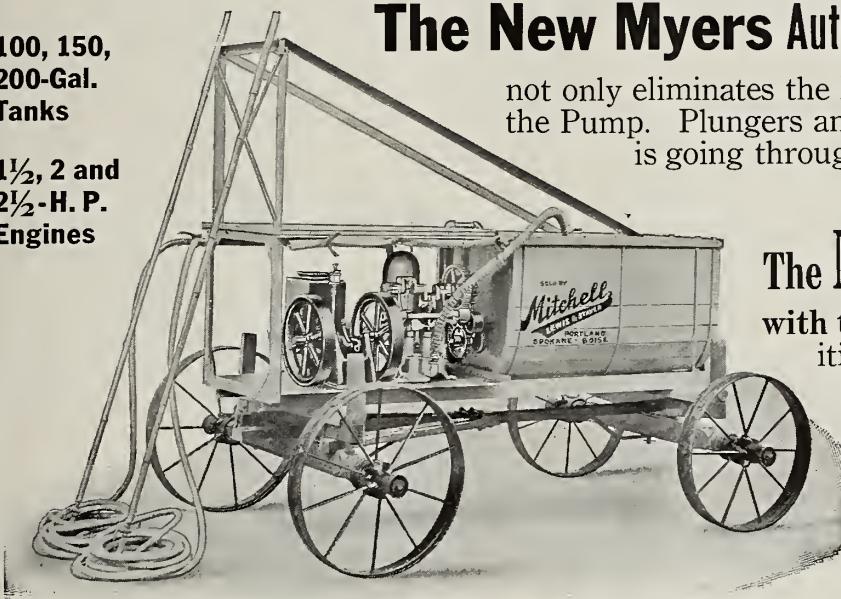
concerns, the conservative individual, the one who has not taken any definite stand, generally feels and expresses himself that such a campaign, calling for a contribution of one cent per box, must be definite in all of the main particulars and the growers assured that all money will be conservatively and wisely handled, with every assurance of creating an additional sale for Northwestern box apples, widening the distribution and extending the markets, before any large percentage of the growers will be induced to agree to contribute one cent per box for this

The National League of Commission Merchants will hold its twenty-fourth annual convention at Indianapolis January 12 to 14 inclusive, headquarters having been arranged for at the Hotel Claypool. The scope of the league's operations and representation extends to forty-two of the largest and most important fruit distributing centers in the United States. A cordial invitation is extended to all kindred organizations, fruit growers, shippers, representatives of the press and anyone that directly or indirectly is interested in the fruit industry. While the Editor of “*Better Fruit*” has attended and addressed the Western Fruit Jobbers' Association and the International Apple Shippers' Association, he regrets he has never had the pleasure of attending one of the conventions of the National League of Commission Men, which are said to be very instructive and interesting and of such nature as to justify every fruit grower attending who can possibly

GOOD BYE—RELIEF VALVE!

100, 150,
200-Gal.
Tanks

1½, 2 and
2½-H. P.
Engines



Mail us the Coupon
so we can send you
FREE BOOKLET.

The New Myers Automatic Pressure Governor Pump

not only eliminates the Relief Valve but prolongs the life of the Pump. Plungers and Valves not in action unless spray is going through nozzles.

The Myers Power Sprayer

with the Stover Engine for Power is positively the best Spraying Rig possible to build.

Light Draft and Cutaway Harrows Myers Spray Pumps



PORTLAND or SPOKANE

Here is my name for your FREE Sprayer Booklet

Name

P. O.

spare the time. The program this year is especially instructive. The social feature promises entertainment that will be very delightful, not only for the men, but also for their wives. One of the main features of the program will be Organization and Co-operation. It will be of special interest to the fruit growers of the Northwest to know that Mr. Wilmer Sieg, sales manager of the Apple Growers' Association of Hood River, six or seven years ago was president of the National League of Commission Merchants for two terms in succession, and was recently elected an honorary member, being the only honorary member of the National League of Commission Merchants.

Orchard Units.—During the past few years many purchasers were told that a splendid living could be made on a very small unit—of five or even two and one-half acres. Now that fruit growers have had time to reflect and have had an opportunity by experience to judge of the possibilities on small tracts, there is a reaction in the opposite direction and an earnest endeavor to get at the logical economy unit. The Editor has never favored anything smaller than a ten-acre tract, which if properly handled will probably pay a good profit on the amount invested. There are strong arguments held out in favor of even larger units, of from twenty to forty acres, for which the following reason is given. With a large unit the grower is enabled to engage in

some line of diversity, therefore is not entirely dependent upon his orchard for his living and other expenses, and there is no question about the advisability of the fruit grower diversifying to a reasonable extent.

Dissatisfaction.—There is no denying the fact that considerable dissatisfaction in the fruit industry has existed among the growers of the Northwest during the last few years. There is nothing strange about this, except that the fruit grower sometimes thinks that he is the only one that is suffering and either forgets or is not aware of the fact that all lines of business have been suffering under the very strenuous depression during the past few years. Usually the fruit grower's lot is really not so very much different, in the fact that he has not been making very much money because other lines of endeavor in the business world are in the same boat. Then too, again, fruit growers must remember that every product of the soil some time during the past few years has gone through a period where it did not pay the cost of production.

Among the different diversities that may be mentioned for the fruit grower are dairying, hogs, cattle, truck gardening, etc., all of which can be combined by different individuals with the orchard industry. One man may be suited to one line of business and have an opportunity to engage in that line and make a success, while another man

will be suited and know more about some other line of farming. One piece of soil may be suited to one diversity crop, and another piece of soil may be adapted to another diversity crop. Therefore it is up to the fruit growers to determine what kind of a side line or diversity the soil is adapted to and what he himself is suited for. If this is intelligently determined, then diversity lines will be a success and a great help to all fruit growers.

Stabilizing the Orchard Industry.—Previous to 1912 there was an extensive setting of apple trees. This was largely brought about by the fact that the Northwest produced very fine fruit and the growers who were in the business had been making good money. A large part of the extra setting is undoubtedly due to the fact that much unreasonable boasting was done, particularly by those engaged in selling orchard lands, and on account of the fact that unreasonable representations were made to growers about the profits that could be made. It is true that considerable orchard land was bought on speculation, and it is also true that many American people rapidly change from one business to another, going from what they are engaged in to what looks more appealing or encouraging. All of these causes have been factors in stimulating the setting previous to 1912. But the orchard industry of the Northwest is rapidly stabilizing itself. Already much of the acreage planted in unde-



Our Motto

HIGHEST QUALITY

OUR 1916 ANNUAL CATALOG

Written, compiled and printed especially for the Western Planters of Seeds, Plants, Bulbs, Roses, Trees, etc., and users of Sprays, Spray Pumps, Fertilizers, Incubators, Brooders and Garden Supplies.

A Reliable, Honest, Truthful Guide Free on Request
New Policy: "Direct from Grower to Planter." No Agents.
Charges Prepaid. Ask for 1916 Catalog, No. 27.

ROUTLEDGE SEED & FLORAL COMPANY
169-171 Second Street, Portland, Oregon

for WINTER SPRAYING

Diamond
Spray-Sulphur
Solution

A dry compound that quickly dissolves—and stays in solution. Will not clog or cut nozzles. Superior form of sulphur for destroying San Jose and other scale insects, and all fungus diseases controllable in the dormant season.

100 lbs. Spray-Sulphur (dry) equals a 600-pound barrel of lime-sulphur solution—and no freight to pay on the water.

Scalecide

The Best Miscible Oil Spray for San Jose Scale and soft-bodied sucking insects. Contains a powerful fungicide. A dormant season spray.

for SUMMER SPRAYING

Corona
Arsenate of
Lead

Contains only Arsenic and lead oxides. No fillers. Easy and quick to mix. Stays mixed longer and sticks better to branches, leaves and fruit than any other arsenate. Always uniform strength. Cannot freeze. Highest percentage killing power. No sediment, no lumps, no waste.

Gould's
Spray Pumps

We are general agents for the Gould Spray-ers, guaranteed to be the best built, most lasting and of the highest efficiency. They are the recognized standard. Send for our special booklet, listing all kinds and giving full data.

Get Our Spray
Literature

Our special booklet on sprays is a safe and dependable guide to successful and accepted spray materials. Write at once for your copy of Booklet No. 205.

Portland Seed Co.

PORTLAND, OREGON



sirable locations has been eliminated. There has been no great quantity of setting since 1912, and as the trees come into bearing at about eight years of age the maximum of production will probably be reached in 1920. In all probability, on account of elimination of acreage for various reasons, the maximum may be reached before that time. It looks very much as if the orchard industry will be stabilized much sooner than many people anticipate.

The Orchard Unit.—The minimum or maximum of the orchard unit will depend very much upon the ability of the fruit grower as to how intensely he can cultivate his land and how capable he is. We frequently see truck growers

making more out of two or five acres of land, or even berry growers or fruit growers, than the general farmer makes off of three hundred acres.

Future Production.—There is no question about the fact that a great many orchards have suffered from neglect during the past two or three years. This is more particularly true in some districts where opportunities have not been favorable than in others. It is very evident to those who have investigated the matter that there will be a considerable reduction in acreage due to the fact that more or less has been neglected during the last few years. It is the same in the orchard industry as in all other lines of business—those

who attend to business, who have good orchards of the right varieties and well located, will succeed. The invariable rule, "The survival of the fittest," applies in all lines of business.

The Western Fruit Jobbers' Association of America will hold its twelfth annual convention in Memphis, Tennessee, January 16 to 20. A very interesting program, both along business lines and in a social way, has already been prepared, assuring everyone who attends an opportunity to secure a lot of information about the marketing end of the fruit industry, as well as a splendid good time. The Editor attended and addressed the convention held in Sacramento, and feels justified in advising every fruit dealer and every grower who can possibly attend the convention at Memphis that it is an opportunity he cannot afford to miss, if he can spare the time and the money to attend.

At a meeting of the Shippers' Council attended by a number of prominent representatives of fruit-shipping interests, which was held in North Yakima December 18, it was decided to postpone a reorganization of the Northwest Fruit Shippers' Council, and the convention also decided to postpone the proposed advertising campaign of the Northwestern box apples until after a survey of the situation by representatives of the United States Department of Agriculture was completed. The four representatives of the government meeting with the Shippers' Council were J. C. Gilbert, C. E. Bassett, W. H. Kerr and C. W. Moomaw.

Losses in Orchard Investment.—There is no question but what there have been some losses in orchard investment, but these have really been due in a large measure either to poor judgment in making the investment or to a desire to speculate on the part of the purchaser. These losses are not different from the losses that are taking place in all other kinds of investments throughout the United States. The desire to speculate, even to gambling, has never been controllable. Millions of dollars are lost in mining property without ever a whimper, but if a man loses a few dollars in an orchard investment there is a kick.

Mercantile agencies put down among the reasons for failure, as one of the largest causes, the lack of knowledge about the business engaged in. This applies to the fruit-growing industry, because many people have gone into the business without knowing anything about it. After getting in it they have not devoted the time and study necessary to learn the business to be successful.

Attending to Business.—After some thirty years' experience in business the Editor has finally arrived at the conclusion that success in a very large measure depends upon attention to business. In fact, the man of ordinary ability who attends to business will succeed, while the smart man who does not attend to business will fail.

Friend Sprayers

you knock off the crate, put on the wheels and drive into the orchard.

Friend King

For extensive work where it is necessary to carry a large amount of spray material into the orchard. Large wheels, wide tires, two-horse draught, cypress tank of 200-250 gallons capacity, propeller agitator which will keep arsenate of lead in suspension, directly connected with pump shaft. Motor pump unit saves space. Keeps bearings and gears in alignment over rough ground. Is rigid and secure, as it sets on common base bolted to wagon bed with four bolts. Every part accessible. Pressure belt and relieved by remarkable regulator. Step platform; steel truck; narrow bed for short turning. Western tread, enabling use in potato fields. Motor pump supplied with suction hose, so hose can be removed and pump cleaned. Recommended for use in orchards of ten acres or more. Delivered complete with whiffletrees, neckyoke, tower and two hose lines.

"I have been busy spraying with two 'Friend' Kings for over a week in our orchards—and the more they run the better they work. Our neighbor's old — sprayer gave out on him and I am sending him over a 'Friend' to finish the job. The calyx nozzle is a wonder, and I am using only two on an outfit where I have been using four angle nozzles before. They put it through a tree with from 200 pounds to 300 pounds pressure."

H. C. Goodwin, Avon, Va.

Send for the Friend Catalog. Tell us what work you want a sprayer to do and to do it well. We have the most economical model for you to use. There's a Friend for every man who sprays at a price he can afford to pay. Get in touch with us today. Get the catalog. Give us enough information so we can advise you how to buy economically.

Friend Queen

Queen is the low-down, cut-under model—underslung, so called. It has all the capacity that KING has in every way. Owing to its UNIQUE construction, its close coupling, the large wheels and wide tires, it is very easy drawing. The fifth wheel is flexible, permitting the machine to go over uneven ground without any probable misalignment of the bed or working parts. The machine was designed many years ago. Everything about it is thoroughly tried—nothing experimental whatever. The tank is CYPRESS. The propeller agitator direct connected. The latest WESTERN, our LARGEST capacity, HIGH PRESSURE unit motor pump is used on both King and Queen. With the Queen outfit it is possible to turn square around, there being no under brace to conflict. The center of gravity of this machine is so low that it is impossible to overturn it on the steepest hillside. Both King and Queen are furnished when specified with towers for tall trees, although in most orchards a man standing on the top of the tank can reach with the spray all right. The motor pump on QUEEN is very accessible—the horses can be turned to one side, giving the operator perfect freedom. QUEEN is very easy to work around; it is so low for filling.

"I know my Queen has pumped more 'stuff' than any other sprayer on earth and it still runs fine."

F. E. Tourillotte, Haverhill, Mass.

The most remarkable line ever offered by a company whose outfit has always deserved the highest respect of the fruit growers. Every machine is both tested in the testing room and given a working tryout before shipping. So when it is received

Friend Lightest King

LIGHTEST KING is the SMALLEST, LARGE capacity, LIGHT weight, HIGH pressure power sprayer ever produced. Very popular for combination field and orchard work. The tank holds 100 or 150 gallons; the motor pump has two hose line capacity at high pressure. The truck is LIGHT, all steel, DURABLE, flexible fifth wheel. The machine is equipped for one or two horses, equipped with one or two hose lines. A tower is also furnished where desired; also field attachment for spraying potatoes and all field crops. The agitator is propeller type, direct connected, no gears or chains. Everything is the very latest and BEST, even the pressure regulator. The tank is CYPRESS. LIGHTEST KING has a very low center of gravity and cannot overturn. The equipment is complete—everything ready for service. "The Lightest King works fine and does the work well; we have enough power to use four lines of hose if necessary." So write Fay Brothers, of Cooperstown, N. Y., on July 14, 1915, and again on August 18 say: "I could not convince any more of the hop growers that they ought to spray their hops for lice and so many of them will have poor hops and some not any. Our yard that you saw is looking fine, and we give all the credit to our 'Friend' and Black Leaf 40."

Send for the Friend Catalog. Tell us what work you want a sprayer to do and to do it well. We have the most economical model for you to use. There's a Friend for every man who sprays at a price he can afford to pay. Get in touch with us today. Get the catalog. Give us enough information so we can advise you how to buy economically.

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Millions of Worms

LAST SEASON

A Fight on Your Hands

THIS SEASON

Select Your Ammunition

WITH EXTREME CARE

HOLD TO WHAT YOU KNOW IS GOOD

The Grasselli Brand

ALWAYS UNIFORM—ALWAYS DEPENDABLE—NEVER FAILS

THE STANDARD

Grasselli Arsenate of Lead Paste

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The Grasselli Chemical Co.

Established 1839

CLEVELAND, OHIO

BRANCHES

New York, St. Paul, Cincinnati, Chicago, St. Louis
Detroit, New Orleans, Boston, Philadelphia



put their houses in order first. Let me illustrate. Early in the fall an old customer bought nine thousand dollars' worth of apples to be placed in cold storage at North Yakima. The purchaser engaged the cold storage and signed a contract therefor with the storage company. One of our biggest competitors ascertained the facts. Their representative went to our purchaser, offered him the same varieties and grades of apples at ten cents per box less and five cents per box less for storage, a saving of nearly a thousand dollars on the transaction. Of course, our purchaser canceled his order.

Here is another: Early in the season a considerable number of sales of Yakima prunes were made in Canada

at forty-five cents per box, or "suitcase." A competitor, desiring to break in and spoil the marketing plans that had been arranged, contracted the crop of a large Yakima grower on a thirty-cent advance and quoted these Italian prunes all over Canada at thirty-five cents a box. Of course, all forty-five-cent orders were canceled and the prune growers of Yakima lost ten cents a box. In that instance, unfair methods of one shipper cost the growers ten cents a box. Until the shippers correct such methods they can't well ask the growers to put up another cent per box for advertising.

Here is another: Wire from our salesman in Montana: "My sale to _____ will not stick. Dealers can-

celed, as they bought C grade delivered at dollar five from grower." A dollar five, less thirty-two and one-half cents freight, made seventy-two and one-half cents to the grower, not counting any expenses for his trip and expenses of sale. Our sale was at ninety-seven cents f.o.b. shipping point. All dealers here at that time were paying growers cash from eighty to ninety cents. I might mention a hundred instances during this season where grower-shippers, curbstone brokers and inexperienced salesmen cut prices and hurt the markets. The damage to the apple market was not serious, for owing to the short supply this season the weak factors could not get enough apples to do lasting injury. But what will be the situation when we have a full crop and need stable markets.

In his recent Seattle statement, Mr. Paulhamus says: "If all the apple business of the Northwest could be brought under one ownership or all the growers could be united into one selling agency, we would have no trouble in working out our problem of developing markets. Such complete control is impossible as long as we have many districts and thousands of growers with individual opinions and prejudices. Therefore, the solution of our problem is to have the men that we must depend upon to sell the crop work together, as nearly as possible, with the efficiency of one organization." Every practical man now admits with Mr. Paulhamus, that it is entirely impossible to get all the growers, or a large per cent of them, into one marketing organization. All practical men also admit that we have too many marketing organizations and too many other fellows cutting

What are your dairy problems?

To get started profitably in dairy-ing as a side-line, the fruit grower needs helpful advice and suggestions.

Our service department will de-light in doing this very thing, with-out any charge or obligation.

We are sole Oregon distributors for "Simplex" Separators, B-L-K Milkers, Papec Ensilage Cutters, Simplex Silos and all kinds of dairy, butter-making and cheese-making supplies.

Your name on a postal will bring Free Catalogs

Monroe & Crisell

126 Front St. Portland, Oregon



prices; too much overhead charges; too many growers selling direct, cutting under the market; too many curbstone brokers showing the buyers how to get prices down; too many "independents" issuing frequent circulars, always quoting lower prices "subject to confirmation," not selling much but ruining the market, creating distrust, alarming the buyers and jobbers till they won't buy at all, and the consumer goes without the fruit, which falls to the ground and rots.

I don't see how the marketing men can look at the wonderful fruit of the Northwest going to waste while millions of people are wanting it and not be ashamed to keep on fighting each other. But what is the remedy? Is there any practical way? Mr. Paulhamus says, and I think he is right, that "the solution of our problem is to have the men that we must depend upon to sell the crop work together as nearly as possible with the efficiency of one organization." Is this possible, and how? In my opinion we must retain all the outlets we now have and utilize them efficiently. We must group and unite the work of the farmer-shipper who has an outlet among his friends in the East for a few cars, the broker who brings in buying orders for cash, the cash buyer with regular customers, the association or union or growers' agent or exchange, each with its extensive marketing machine and regular customers. We should keep all our brands and lose none of our loyalty for our various organizations. Do not the English and French and Italians and Russians fight together as earnestly as possible for a common cause, but each nation under its own flag? So the marketing concerns should unite. But we must change the sentiment—"My organization, right or wrong, it must succeed, no matter if the Northwest fruit industry is ruined." What need of fruit-marketing organizations after the fruit industry is ruined. Our sentiment should be, "My organization must be right, must play the game square, must be willing to give and take, must treat the other shipper as we would have him treat us."

There are four classes of growers, the grower who sells for cash, the grower who ships to distant markets on consignment, the grower who believes in and belongs to a co-operative organization, and the grower who employs the best selling agent he can find to sell his fruit for him. No matter what we may do we will always have these four classes. How can we harmonize these four classes and get them to work together. Let me illustrate. Under a reciprocal arrangement in each district the marketing organizations could employ one man to represent us all in the Philippine Islands. Such a man could create a new market for several hundred cars of apples. No one shipping concern has yet thought it could afford to do this. We could all unite and send a salesman to South America, with like results. When the war is over we should have at least one man in Rotter-



Ask any owner who attended our 1915 Caterpillar School. He'll tell you how the school increased his profits, taught him to get maximum results from his tractor. And our annual Caterpillar School in Stockton, Calif., and Spokane, Wash.—free to owners—is just one branch of our complete service.

CATERPILLAR
Reg. U.S. Pat. Off.

Don't Say Caterpillar Un'less You Mean Holt!

The best service we give is the service we build into the Caterpillar *itself*—the kind of service of which owners write: "Have used my Caterpillar five years. The original track chains are still in use."

"Repair bill for season less than \$10.00."

"\$10,000 worth of work this year—repair bill \$1.65."

A postal will bring you Bulletin BE 334 which describes the Caterpillar fully. Or if you're interested in the Caterpillar School, opening January 31st, write for particulars—a low tuition fee admits you if you're not a Caterpillar owner.

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Grand Prize
San Francisco
& San Diego
Expositions**

THE HOLT MFG. CO., INC.

Portland, Ore. Spokane, Wash. Stockton, Cal.
Cons. Wagon & Mch. Co., Sales Agts., Salt Lake City, Utah.
F. B. Connelly Co., Sales Agts., Billings, Great Falls, Mont.

Southern California

"THE MAGIC LAND OF PALMS AND FLOWERS"

Southern California has much to offer you this winter. City or country, mountains or beach resorts all are inviting. The Panama-California Exposition at San Diego will remain open another year—bigger and better than ever. But Southern California offers something even greater than this. It is the ever-present and delightful

Sunshine and Flowers

Roses in bloom, Oranges and Lemons ripening on the trees, Poppies and Geraniums everywhere. This is the real California. The expense of a trip to Southern California is not great.

Low Round Trip six-month tickets are on sale daily from Pacific Northwest points. Stopovers are allowed at pleasure. Through car service on the limited trains, through dining car and observation cars make the all-rail route the delightful way to go.

Ask your local agent or write
John M. Scott, General Passenger Agent, Portland, Oregon

SOUTHERN PACIFIC

S.O.S. From the good ship "Long Bow."

"A periscope has just been observed to port—we are altering our course, hoping to zig-zag away from the enemy—send help quick—."

The message suddenly stops. It is believed that the Long Bow has gone down with all hands. Prominent among the passengers was Mr. Bunco Skinner, whose spectacular success as promotor of the Continental Market Distributor's Bureau attracted wide attention. It is reported that Mr. Skinner was urged to devote his talents to **INTERNATIONAL PIRACY** and he is said to have been on his way to accept such a post with a prominent European belligerent when the Long Bow was submarine.

(C. C. P.)

Good Bye, B. S., Proud Produce Pirate!

Your B. S. schemes have served their purpose if their lessons have been learned by Better Fruit readers who have watched your trail.

Northwestern Apple Producers will never prosper till they quit being gulled by clever prestidigitators who profess to pluck dollars out of the thin air. The latest form of this emotional insanity is to be found in the **NATIONAL DISTRIBUTOR IDEA**. This idea insures a rake-off to everybody except the producer—he gets what is left.

There is no magic in mere size and volume. The formidable combinations of so-called National Distributors are everywhere breaking down, and the trade is settling back to the time tested and normal condition of **INDIVIDUAL EFFORT**. The victims of the National Distributors are tired of holding the bag. The number of independent local shipping organizations is increasing. The F.O.B. sales are heavier, and we are beginning to hear of F.O.B. auction sales.

The producer's problem finds its true solution in a **UNION OF INDIVIDUAL EFFORT AND LOCAL CO-OPERATION**. Carry your eggs in one basket and then watch the basket. The small producer cannot watch a National Distributor, but he can watch and guard his interests in a local union of neighbors.

The Produce Reporter Company stands for the individual producer and for co-operation. The story of how to market your produce safely and get the maximum returns will be sent to anyone interested. It is free on request.

Produce Reporter Company
CHICAGO

dam, one in London, another in Hamburg, possibly another in Copenhagen and north—when we can ship direct through the Panama Canal.

But the great big work of getting new markets and multiplying our outlets is in the small cities and towns of our own country. It is easy in a year of moderate prices to put a carload or two of apples in a town or village that only gets a hundred or two boxes per year now. For ten years I have consistently worked on this plan, opening up these new small markets. This year, according to railroad records, the Yakima Valley shipped 1,000 cars of mixed fruit into these small markets. The sales organization I represent shipped 423 carloads, leaving less than 600 cars for the other one hundred and thirteen Yakima shippers. If only two or three other shippers had duplicated our work in this line the soft-fruit marketing problem would be solved. I agree with you this can be done only as we get together in each valley or district on joint-selling boards or by reciprocal arrangements with each other and with the other districts. If the main shippers in each valley will get together on a joint-selling board, send out one set of prices and one set of traveling salesmen, working together and not fighting each other, the marketing problem will be solved. I admit this will take a lot of patience, organizing ability and real up-to-date salesmanship. But tell me, why shouldn't we do it? Isn't our orchard industry worth the effort? Why should we have one hundred and fourteen sets of prices go out of the Yakima Valley? Why should the Northwest have fourteen apple salesmen in Bozeman at one time and not one salesman in fourteen hundred other towns? Why should we maintain eight salesmen in Butte when two could do the work better?

You ask what we accomplished this summer at Yakima, with the assistance of Mr. Paulhamus' committee, Mr. Davidson and the Growers' and Shippers' Councils. First, remember, all the machinery was new; most of it had to be made or remade without any money when the season was full on and the marketing machinery in motion. One big thing we accomplished by united effort was getting Uncle Sam to send out two young men from the Bureau of Markets. Daily meetings with these men, receiving telegraphic reports from Washington City, giving prices at all Eastern markets, distribution of our own shipment and our competitors', and getting this information at one p. m. each day were helps that can scarcely be overestimated. It was a great drawback that the farmer-shippers and some other busy shippers would not meet regularly, so did not get all the benefit.

Another big thing we found—that it is absolutely necessary to have the assistance of strong cash buyers, or have a considerable guarantee fund to draw on to protect the market at critical times, or perhaps both. Our situation was that three cash buyers were openly

Don't Get Wet

and carry around a load of water and a cold.

Tower's Fish Brand

Reflex Slicker
\$3.00

sheds every drop. Easy fitting and strong at every point. **Reflex Edges** stop every drop from running in at the front.

Protector Hat, 75 cents

Satisfaction Guaranteed

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TOWER'S
FISH BRAND

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of a practical book on tillage, issued by a firm who have for nearly 50 years studied every phase of cultivation and who make the tool that's the favorite of thousands of farmers—the original CUTAWAY (CLARK) Disk Harrow. This is a textbook—not a catalog—and it's free. Send for it. Learn the reason for intensive tillage. Learn why the Disk Harrow is used and how it acts. It's the tool of many uses on farm, orchard, garden and cut-overland. It makes perfect seed beds, saves time and labor and lasts a lifetime.

With the book we send our new catalog. Write for both of these valuable books **NOW.**

The Cutaway Harrow Company

940 Main Street
Higganum, Conn.



SOLD BY
MITCHELL, LEWIS & STAVER CO.
PORTLAND—SPOKANE

Western Pine Box Sales Co.

HIGH GRADE FRUIT BOXES

APPLE, PEAR AND PEACH BOXES

Fruit and Vegetable Crates

GOOD SERVICE—Write us
SPOKANE, WASH.

Protect Your Trees

Don't take chances with your young trees. One grub will kill many in a single night. Metal and cut worms will damage and destroy them if you don't protect them. Get dollars' worth of protection at a fraction of a cent cost by using

Hawkeye Tree Protectors

Absolute protection against grawers and borers. Prevent trees from becoming skinned and bruised by cultivator or lawn mower. Made of elm veneer, chemically treated. Easily put on and will last as long as the tree is beyond need of protection. Don't wait until some of your trees are killed—order Hawkeye Protectors now. Regular size 10 inches wide, 20 inches high. Price in lots of 100, 1 cent apiece, in lots of 1000— $\frac{1}{4}$ cent apiece. Special sizes made to order. Write for circular and samples.

We make Fruit Baskets—get our prices.

Burlington Basket Company
122 Main St., Burlington, Iowa

and unitedly fighting the proposition. Another thing we ascertained; whether price agreements are unlawful or not, they are not feasible, and are undesirable. Not feasible because the scores of grower-shippers do not come in to make them, and those who did come to the meetings apparently came to ascertain the prices being quoted and then proceeded to quote at five or ten cents less. Some of the brokers attended the meetings, played the game square, but they didn't get any business, because no buying orders will be sent unless at a lower price than the principals can buy on regular terms. My own feeling is that there is a legitimate field for brokers as business getters, and that the discount they should have for getting the customer and getting the money would pay them well. But they should not issue general circulars at cut prices on regular shipping terms and depend on the growers to fill the order and hold the sack. The buyer in Philadelphia or anywhere else can well afford to pay a good live broker five to ten cents a box to buy, inspect and pay for a car of apples. The joint-shipping board can well afford to allow this five or ten cents for the sale, cash payment and inspection at this end. Let's not fight the broker, but get him to come in with us and be a benefit instead of a hindrance. With the correct recognition of the services the broker performs, I believe the legitimate fruit broker can be made a considerable benefit.

You ask how to handle the "grower-shipper." The grower-shipper who ships to his friends back East in markets which the regular shippers don't reach and gets ten cents per box more for his peaches is doing the fruit industry a distinct service. He is not a price cutter or a market destroyer. He is a genius, a benefactor to the industry. I wish the growers could all do this kind of marketing. But the growers who do this kind of marketing are few. It is the grower who loads his fruit, rolls it to the commission merchant on consignment, rolls it "wild" to Montana or Dakota, takes a train and offers his fruit to retailers at any old price—he is anything but a benefactor. When Mr. Davidson and the shippers got the f.o.b. price of peaches up to thirty cents at one time

Planet Jr. Orchard Cultivator

—the orchardist's "right-hand man"

This No. 41 Planet Jr. Orchard Cultivator produces biggest crops in orchard, vineyard or hopyard. The strong frame carries teeth, sweeps, discs, furrowers, irrigating steels, plows, alfalfa teeth, and special weeders. Low wheels, steel tongue, tree shield, side-hitch for low trees. Light draft. All steels specially hardened. Works deep or shallow, and cuts 4 to 6½ feet wide.

Fully guaranteed. New low prices. Made in 5 different styles at various prices.

Write for New 72-page Catalog, free. Describes over 70 tools, including 12 entirely new ones, and improvements to whole line.

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We carry stock in San Francisco and Los Angeles. Agencies in all principal Pacific Coast cities.

last August, a big Zillah grower was back in the Bismarck and Fargo territory offering his Elbertas at twenty-five cents to retailers and wholesalers alike, and shed tears because he couldn't sell them. He couldn't sell them because he had ruined the market. At the same time Sioux City wholesalers bought four cars direct from growers, two at 20 cents and two at 20.4 cents, when all the regular dealers were trying to get and were getting 27½ and 30 cents.

In my opinion, the "grower-shipper" is a product of the marketing men's own folly. Because some organizations have for five years conducted a crusade and preached the doctrine of hate against the old shippers that had grown up with the business, and because some of the old shippers have answered in much the same colored fumes, the "grower-shipper" has been produced. Ground to powder, while, and because, the market men were fighting, getting less than cost of production for his products, the grower has been driven to despair. He has lost faith in the men and organizations who have sold his fruit. The "grower-shipper" is the natural product of our marketing follies and fighting. When we quit fighting, when we consult our common sense, when we marketing men get together in the different districts, the grower-shipper will no longer be a menace, because it will pay him better to market through efficient marketing agents. I think I have foreshadowed my idea of

the present remedy. Get together in the different fruit districts on joint-selling boards, or get together by reciprocal marketing arrangements, and then let the different districts reciprocate. In my opinion, this can be done under the general supervision of your growers' councils and leagues and units, which should have a closer organization. But the marketing plans, the reciprocal arrangements, must be worked out by the marketing men.

Continued in next issue

The winter short course of the Oregon Agricultural College will be held January 10 to February 4, 1916. These meetings are largely attended by farmers and fruit growers from different parts of the Northwest, because they have found them to be of much value in assisting them in their work. The course this year will consist of fruit raising, stock raising, dairy work, poultry, gardening, sewing, cooking, household arts, farm engineering, marketing, etc. Every fruit grower and farmer who can possibly arrange matters to take one of these courses will be well repaid for so doing.

"Mushroom Growing," by B. M. Duggar, is a new treatise on this subject, published by the Orange Judd Company, 315 Fourth Avenue, New York.

Mr. Ramie de Ruew of Simmons, Washington, has ordered 85 tons of Shady Brook Sheep Feed for use during the lambing season.

The Walla Walla Meat & Cold Storage Company has ordered 100 tons of Shady Brook Sheep Feed to be used for fattening.

DOW ARSENATE OF LEAD

For the past eight years this material has successfully lead all others. Quality is our watchword, and you can use **Dow Arsenate of Lead** with the feeling that you have the best that money can purchase. When the codling moth is as numerous as it has been the past season, it affords a good opportunity to demonstrate the real value of **Dow Arsenate of Lead**, and the record it has made in the Northwest the past season should cause you to insist upon this brand for the coming season's work. Address us for names of distributors in the Northwest, and we will be glad to refer you to one in your community or close by.

The Dow Chemical Company, Midland, Michigan

The Drink that gives WOMEN Strength



Ghirardelli's Ground Chocolate is a sustaining beverage. Women whose strength is taxed for any unusual cause will find a daily cup of Ghirardelli's just the thing to meet the drain on their bodily vigor.

Ghirardelli's Ground Chocolate in hermetically sealed cans is a blend of finest cocoa and pure sugar—delicious, strength-bestowing—an economical palate-stirring food-beverage.

Ghirardelli's is used in more homes in the West than all other brands of chocolate combined. For your protection be sure you get

Ghirardelli's The Only Ground Chocolate

In $\frac{1}{2}$ -lb., 1-lb. and 3-lb. hermetically sealed cans. There's a double economy in buying the 3-lb. can.

D. GHIRARDELLI CO.

Since 1852

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How Spray Kills

Continued from page 18

eating it shall be indifferent to its presence. Doubtless it is true that combination sprays have often proved effective and that success has often followed the addition of lime to a poison spray, but in such cases success is relative, and better results would have probably been secured if the poison had been left tasteless.

The use of an alluring bait is directly opposite to that of the repellants. Traps and sprays have been prepared with molasses, syrup, glucose, sugar, salt, manure, milk, lemons, oranges, cider, vinegar, aromatic oils or beer added to entice the various insects. Here, again, one sort of bait will not answer for all kinds of insects. Even

closely related species vary in their choice of flavors.

Arsenicals have long been considered the best of stomach poisons. With these sprays the object is to coat the food plant and the insect must then unconsciously partake of the poison when feeding. If the dose swallowed is weak, the insect ceases feeding, is attacked with a diarrhoea and finally relaxes in death. If the dose is strong a sort of inflammation of the bowels immediately sets up and death follows in a few hours. An arsenic compound must be insoluble, since the presence of free, soluble arsenicals scorches the foliage. For this reason the extremely poisonous white arsenic cannot be used in spraying, but the insoluble arsenates of lead, or arsenites of lime, zinc or copper can be safely applied, at least

under the usual Washington conditions. The compounds of arsenic and lead, zinc or lime have varying degrees of stability. Basic arsenate of lead is extremely permanent; it can be used with safety in climates where other arsenicals scorch. But for the same reason it is slow to kill, for an arsenical must be digested and absorbed by the insect before it can cause destruction, and in the meanwhile the wormhole is becoming larger. Zinc arsenite is a quick-acting insecticide. It is easily absorbed in the insect's body and it is therefore valuable for the larger species which require a stronger dosage than weak, newly-hatched insects do. But this quickness of effect implies relative instability, and in fact zinc arsenite has caused serious scorching in damp weather. Arsenites of lime and of barium are coarse grained and have been ruled out as insecticides because their particles loom up too large to deceive the microscopic worm.

Arsenicals are dangerous poisons when taken in the proper amount. Very weak dosages act as a stimulant, to whet the appetite and add to one's endurance. It is well known that certain people eat arsenic in increasing amounts, beginning with the maximum safe dose of one-twelfth of a grain and

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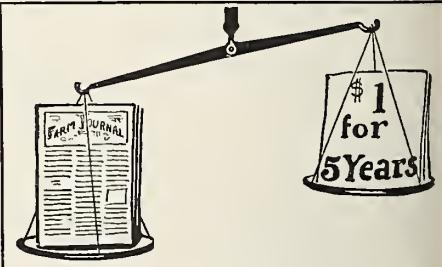
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adding to this until they finally are able to take more than six grains at a time, or several times the amount that would normally produce death. If a tree is poorly sprayed, a leaf-eating insect might get here and there a particle of arsenic to act as a tonic, and a spraying might therefore conceivably do more harm than good. To test this hypothesis Professor C. T. Brues of Harvard University and I last year secured eggs of the Gypsy Moth from sprayed and from unsprayed woodlands. The caterpillars developing from these eggs were fed varying but weak dosages of arsenic and showed a measurable resistance to the poison in favor of the caterpillars reared from the sprayed trees. While this experiment shows that there is a hereditary difference in insects in their susceptibility to poison, its explanation is perhaps merely this: Where spraying is not thorough, so that not all insects are killed, the ones that escape are most apt to be the hardier, more resistant individuals, and such vigor is apt to be transmitted to coming generations.

Contact insecticides are, generally speaking, of two kinds—those that suffocate the insect by clogging or poisoning the breathing system, such as soaps, oils, tobacco or fumigants; and those like sulphur-lime or sulphur-soda, that produce a chemical reduction of the insect's body. Insects breathe not through a mouth or nose, but through a series of pores arranged along the sides of the body. These pores open into a system of tubes of microscopic fineness, which permeate every part of the body. Plugging of the pores by oils or soaps results in death. Here the spray must actually wet and adhere to the greasy body of the insect, which explains why nicotine in water solution is much less effective than when combined with soap.

Sulphur-lime is a very unstable solution. Principally it consists of a chemical called calcium polysulphide (CaS_4). As soon as exposed to the air this substance absorbs oxygen and is converted into a series of compounds known, in the order of their formation, as calcium thiosulphate (CaS_2O_3), calcium sulphite (CaSO_3) and calcium sulphate (CaSO_4). This reaction calls for a progressive absorption of oxygen and a simultaneous deposition of the finest of sulphur. The combined action of the withdrawal of oxygen from the insect sprayed and the effect of the deposited sulphur are supposed to account for the insecticidal action of sulphur-lime.

Sulphur-soda has proportionally much more of the thiosulphate compound, which in this case, as sodium thiosulphate, is the familiar "hypo" used by photographers, and has no insecticidal value, as it is not oxidized further. Theoretically, therefore, a sulphur-soda spray should be less efficient than sulphur-lime, instead of being much better as claimed by the manufacturers.

The decomposition reaction of sprayed sulphur-lime is rapid at first, but con-

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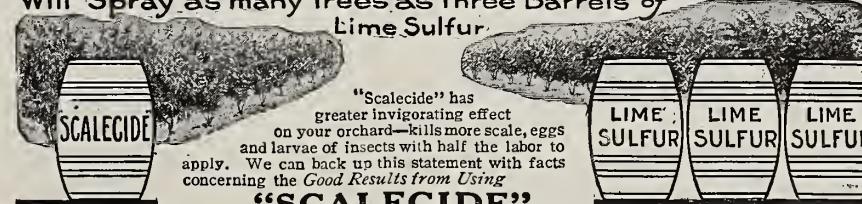
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Mfrs. of the Highest Grade Telephone Equipment in the World.

One Barrel of "Scalecide"
Will Spray as many Trees as Three Barrels of
Lime Sulfur.



"Scalecide" has greater invigorating effect on your orchard—kills more scale, eggs and larvae of insects with half the labor to apply. We can back up this statement with facts concerning the Good Results from Using
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Send for our illustrated booklet—"Proof of The Pudding". Tells how "Scalecide" will positively destroy San Jose and Cottony Maple Scale, Pear Psylla, Leaf Roller, etc., without injury to the trees. Write today for this FREE book and also our booklet—"Spraying Simplified". Learn the dollars and cents value of "Scalecide, The Tree Saver".

Our Service Department can furnish everything you need for the orchard at prices which save you money. Tell us your needs.

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The Alpha Automatic Power Spray Outfit

(PATENTED)

Fitted with 2-inch or 2½-inch Automatic Duplex or Triplex Pump.—Equipped with the New Mechanical

Automatic Pressure Governor

Which Insures Safety, Secures Uniform Pressure and Eliminates Unnecessary Wear.—No Relief or Diaphragm Valve Required.—Top Guard Rails Fold Up or Can Be Quickly Removed.—Gear or Belt Driven.—Brass Fitted Throughout.

THE TWO ESSENTIALS in a power sprayer are a thoroughly dependable engine of ample horsepower and a positive and reliable pressure regulator that will insure uniform pressure and eliminate unnecessary wear.

THE AVERAGE SPRAY RIG is equipped with a cheap engine and a makeshift pressure relief valve or diaphragm, which is exposed to the corrosive action of the spray material, which soon puts it out of commission.

THE ALPHA AUTOMATIC PRESSURE GOVERNOR with which the Alpha Spray Outfit is equipped is a simple arrangement of a combined lever and spring on each plunger connecting rod which, when the pressure reaches a pre-determined limit, automatically discontinues the operation of the pump without interrupting the driving power, again permitting it to resume operation when the pressure falls below the point at which it has been set.

THIS INSURES SAFETY, secures uniform pressure, and eliminates unnecessary wear (no liquid pumped except it passes through the nozzles), the pressure relief is not dependent on the operation of a sluggish or defective relief valve, but is positive and mechanical, thus making it impossible to run the pressure up to the danger point.

THE POWER PLANT, depending on the size rig, is either a 2½-h.p. or a 3½-h.p. Alpha Engine, equipped with a "built-in," gear-driven, positively-timed magneto, requiring no batteries or coil, and is easily started on the magneto without cranking.



CAN YOU AFFORD to own a spray outfit that will balk? When you get ready to spray you have no time to tinker with a defective engine, pump or relief valve, but want an outfit that is capable of a continued high pressure maintenance and one that is thoroughly dependable in every particular.

THE ALPHA AUTOMATIC SPRAY OUTFIT will meet your most exacting demands. The entire framework is made of channel and angle iron, fitted with a wrought steel bedplate on which the engine and pump are mounted, direct connected with machine-cut steel gears.

BUILT IN ALL SIZES from a 2-inch pump and a 100-gallon tank to a 2½x3-inch pump and a 200-gallon tank. (Either duplex or triplex.)

IT WILL PAY YOU to investigate thoroughly the merits of the Alpha Automatic Power Sprayer before buying. Send for catalog and prices.

DE LAVAL DAIRY SUPPLY CO.,
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Please mail your Catalog C-2 describing your Alpha Sprayer Outfit to—

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Everything for the Dairy

tinues for a month or more in a weaker and weaker degree. Not all scale insects succumb to the first shock following the application of spray, but many individuals maintain a tenacious hold on life that carries them past the danger period, and later these few individuals grow and reproduce. Sulphur-lime undoubtedly induces a selective mortality in the case of the San Jose scale and of the eggs of red spider and aphids. In these cases the actual strength of the solution appears to have little effect on the degree of resistance of the insects.

Farmers' Week at O. A. C.

The Farmers' and Home-makers' Week and Rural Life Conferences to be held during the week of January 3, just in advance of the regular short course, will give the fruit grower and farmer a splendid opportunity to hear lectures on valuable subjects of vital importance to them. There will also be brief, pointed, instructional lectures by leaders in our state and from other states on subjects of importance to home-makers, engineers and all industrial workers. There will be demonstrations in the laboratories, dairy, domestic science kitchens, stock barns, gardens, orchards, greenhouses and fields. There will be opportunities afforded for examining and testing the merits of many different types of farm machinery; opportunities for judging, according to accepted standards, the different breeds and types of livestock; conventions and conferences of some of the state's greatest industrial and professional associations.

The Oregon Agricultural College is going to make this week a profitable one for all those interested in the development of the state, community and of the individual. As the regular college will not be in session that week, the students' quarters will be available for visitors, thus assuring ample accommodations at moderate prices. The college faculty will devote their entire time to personal interviews and to the regular exercises of this week. The railroads will give reduced rates and

there will be no charges or fees for the lectures or conferences. For further information write R. D. Hetzel, director Extension Service, Corvallis, Oregon.

Brewster, Washington, won the sweepstakes award for the world's best apples, which went to Mr. Fred Conklin. This exhibit was prepared by Henry E. Tweed, a student of the Washington Agricultural College, Pullman. Much credit has been given Mr. Tweed for the careful pains in preparing the exhibit. Considerable amusement is being obtained at the expense of Hood River, for the reason the exhibit of Hood River was seven points ahead in the scoring until the judges happened to discover a tiny worm in the Hood River exhibit, which lost the prize for the State of Oregon, giving the honor to Mr. Fred Conklin of Brewster, Washington.

Feijoa Sellowiana is the name of a new fruit that is being introduced by W. A. Lee, Covina, California. The fruit is about the size of a hen's egg and is said to be of very delicious flavor. The Feijoa Sellowiana is a native of Southern Brazil and Uruguay, having been introduced into the moderate climates of France and Southern California very successfully.

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Order your trees direct from longest established, most reliable nursery in the West. Save money—avoid disappointment, 500 acres—50 years thoroughly reliable dealings. Get our list and prices before you buy a tree :

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WOODBURN NURSERIES
Woodburn, Ore.

SHADY BROOK DAIRY FEED

What One User Says

"It speaks well for Shady Brook when three cows fed upon it make over 105 pounds butter in seven days and each breaks a world's record for age."

As a modern business dairyman we ask you to try our Shady Brook. It is produced by the best economical and profitable feed in the market. It is pure, white and high grade cane molasses, 50% sugar.

Write for name of nearby dealer and booklet No. 70.

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Encyclopedia of Practical Horticulture

"JUST WHAT WE HAVE WANTED"

A SCIENTIFIC work written in plain language and devoted to practical ends. The only work of the kind now complete and up-to-date. A thorough manual of fruit and vegetable growing, covering every practical feature. Plant troubles, the fullest ever listed in one work with every remedy. Planting, pruning, spraying, harvesting, packing, marketing—all the methods so successfully practiced in the Northwest. Statistics of the fruit and vegetable business. All carefully indexed. Four volumes, 2,064 pages, 750 splendid halftones, drawings and colored plates. 200 contributors.

"Every grower should have it, for between its covers may be found the answer to practically every horticultural problem with which he will sooner or later be confronted."—E. K. CARNES, formerly Entomologist for the California State Commission of Horticulture, and now Superintendent Natomes Consolidated, Sacramento, California.

Write for circulars and prices to "Better Fruit," Hood River, Ore.



Advertising the Northwest Box Apple

By Orris Dorman, President Spokane Fruit Growers Company.

I MIGHT say first that no definite plan of operation was presented, and it was advised that the formulation of the plan be left to the board it was proposed to create to manage the undertaking after funds were provided. The principal argument presented by its advocates was that we should agree that something should be done; which we believe has been agreed on the part of the growers for some years. While there was no plan of operation presented, Mr. N. C. Richards, general counsel for the North Pacific Fruit Distributors, stated that the plan was to go into a market and create a demand for Northwestern box apples, letting all sell who wished to do so. That, to our minds, would greatly intensify the competition in such markets between those contributing the funds, to say nothing of the quantities of apples that would be attracted to it belonging to outside shippers. Manifestly the only beneficial results of such an undertaking to those financing it would be the benefits accruing to box apples generally by developing markets that took

care of additional tonnage, and we doubt that our growers would support such an undertaking for any length of time.

It is our belief that our growers have been asked so often to join different organizations looking toward the betterment of the marketing conditions for their fruit that a large percentage of them will refuse to give favorable consideration to this matter for the reason, if no other, that they have contributed liberally of their funds on many occasions and are now determined to wait until some organization makes good in its merchandising methods and sells to better advantage the fruit entrusted to it. In view of this fact, it occurs to us that the safe plan to follow at this time is for each district, or each shipping organization, to proceed on its own market-developing plans or to pick up and perfect the market-extension plan partially tested by Hood River and Spokane, until something definite is proposed that promises better results.

Experience has proven that the details of this plan of operation can be carried out by the salesman of average ability. It is not so exorbitantly expensive and the increased prices received appear to go a long way toward meeting the expense. It has a certain amount of prestige, which at this juncture seems necessary. The plan is one by which many other industries have developed markets and held them and increased them to take care of a constantly-growing product. Fully developed and undertaken on a scale large enough to move the bulk of the tonnage of some of our large districts, it should be attractive to the ambition of any of those who wish to succeed in a large way at this sort of thing. True, it does not present the dazzling allurement of the suggested plan of general advertising and market extension, with a fund running into six figures. It appeals to the grower, however, as he can be made to see where his money is being spent in the very simple and effective undertaking through specialty salesmen and advertising to intensively work certain fields in the sale of his varieties and his brands. The benefits accruing to box apples generally, of Colorado, California or even of the neighboring Northwestern States, is merely incidental. There is nothing new or spectacular about it. It is simply beginning at the beginning, or at the bottom, and working up with the means at our command, without attempting to create new means or new agencies, which might prove impossible and which quite likely when created would prove impractical.

If anything approaching reasonable division of territory in which each separate organization can work in the upbuilding of new markets, spending its own money in its own way, free from the competition of other like organizations, we believe that each can serve its growers more acceptably than a combination can serve all the factors composing it. In addition, it can spend as much money and effort as it pleases in markets that cannot be divided, that will always remain common fighting ground. In this way only can the competition between varieties and between brands, that we have always heretofore felt, be eliminated. In this way the jealousies and suspicions between districts can be eliminated that have heretofore, and always will, render ineffectual any combination on a large scale of conflicting interests and ideas.

The Famous Aetna Brand

of guaranteed absolutely pure Lime and Sulphur Solution. Manufactured by an Orchardist of over 25 years' practical orchard study. The spray that spells perfection. Recommended by leading growers to be the best on the market.

FOR PRICES, ETC., WRITE B. LEIS

B. LEIS, The Aetna Orchards

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BEAVERTON, OREGON

Dependable Brand Lime Sulphur Solution

The Standard Solution for the Fruit Growers of the Northwest. Highest percentage of Sulphur in Solution in proportion to Baume test of any brand offered on the market.

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GIDEON STOLZ CO., Salem, Oregon

SPRAY

with Sherwin-Williams *Dry Powdered Insecticides and Fungicides*

No water—all poison—easy to ship and handle—no danger of freezing, drying out or spoiling—the latest improved scientific mixtures that give maximum killing power without injury to foliage:

Arsenate of Lead
Fungi-Bordo
Tuber-Tonic
Lime-Sulfur } All in
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Send for our Spraying Literature

THE SHERWIN-WILLIAMS CO.

Insecticide and Fungicide Makers
707 Canal Road, Cleveland, O.



the Gasoline of Quality

Highest award at San Francisco and San Diego Expositions. The gold medal gas—first in carbureting qualities, in purity, in uniformity.



Red Crown
the straight
refinery gasoline
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For almost ten years PICTORIAL REVIEW has stood supreme in the world of fashion. Besides there are general household helps and hints in every issue of the magazine—the sort of information which every practical house-keeper delights in,

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\$100,000 has been paid for fiction which will appear in PICTORIAL REVIEW this next year. Four great serial stories by world-famous authors. From four to eight short stories by the best short story writers in the world will also appear in each issue. Besides there will be fact and feature articles that will interest all.

This offer is for a very limited time only, therefore send your order soon and you save 85 cents on your subscription investment.

Address "BETTER FRUIT," Hood River, Oregon

Each district or each shipper, trying to outdo every other in their methods of merchandising fruit promises the simplest, least expensive and most effective plan for market development. It has in it elements of strength that would make for continuity of effort. Operations that can be financed year after year must get results that are easily pointed out to the grower. Our growers and business men could understand the plan of operation, know how and where and by whom their money was being spent, could accurately measure the results obtained and could fix the responsibility for success or failure upon men employed by them and answerable to them.

The new plan proposed does not even follow the idea always heretofore advanced that in some way the tonnage should be brought under control, and an effort made to orderly distribute it in the different markets, according to their size. While I believe that no effort will ever succeed in properly controlling and distributing the tonnage, it seems to me that through our plan is promised greater control of the tonnage than anything yet suggested. I can see no way of equitably distributing it, and marketing it orderly, until markets for all of it are found and methods followed that naturally direct the tonnage of the various districts to such markets. It seems illogical to me to try to prepare the markets generally for the tonnage generally of all our Northwestern growers. Some have proposed an all-Northwestern brand to be used in the general extension of our markets, and if such an arrangement could be effected and the fruit of this brand used without any apparent discrimination detrimental to any of our districts, or to the various varieties of fruit grown in the different districts, and the plan looked promising enough to insure its continuation from year to year, it might result in a great deal of good to the industry. However, it seems to me that it would be impossible to effect an arrangement of that kind that could continue permanently. I believe the effort would shortly degenerate to a point where we would have one more competing brand of fruit offered in the markets.

We are not expressing our opinion at this length because we believe that anyone is trying to take any advantage of any body of our growers. We concede that the advocates of this new theory of market development are just as sincere as we are in their efforts to promote better conditions generally. We have formed these ideas through our study and experience and submit them for what they are worth. We will insist that any plan submitted to the growers asking for the expenditure of their funds shall be carefully thought out and presented in a way that will give them an opportunity to consider its merit before voting upon it. This was specifically asked for in the resolution passed at the Growers' Council, and nothing with great indefiniteness about it will appeal to them.

ONCE IS ENOUGH ISN'T IT?

If the codling moth got 30% of your crop last year, how much will it get this year unless you

Use Crown Mass-o-Spray Nozzles

The only solid-cone-spray nozzles made.

Often imitated but never equalled

A GOOD NOZZLE IS KNOWN BY ITS FRUIT

MOST NOZZLES MAKE A BIG SHOW AND A LOT OF NOISE ABOUT IT BUT DO NOT HIT THE RIGHT SPOT.

THE CROWN MASS-O-SPRAY HAS DOUBLE THE PENETRATIVE POWER OF OTHERS & HIT THE CENTER READ THE LETTER AND THINK IT OVER

A NOZZLE WHICH WILL SPRAY AGAINST THE WIND IS WHAT YOU WANT. THIS ONE WILL DO IT. IT THROWS A SOLID CONE SHAPED MASS OF SPRAY. NOT A HOLLOW CONE AS OTHERS DO. IT COVERS IN HALF THE TIME. THE PRICE IS ONLY \$1.00 FOR TWO SENT BY MAIL AND GUARANTEED

CROWN SPECIALTY CO.
1629 WASHINGTON BLVD. CHICAGO, ILL.

WE MAKE THE MOST PERFECT SPRAYING ACCESSORIES ON THE MARKET. IT IS AN EXACT SCIENCE WITH US. INSIST ON HAVING THEM

A CROWN RELIEF VALVE ON YOUR SPRAY PUMP WILL SAVE A LOT OF TROUBLE. THERE IS NO "JUST AS GOOD" PRICE \$4.00 BY PARCELS POST.

Dear Sirs:
herewith hand you money order for One Dollar to pay for the two mass-o-spray nozzles you sent me for trial some time ago. I want to say that you make no mistake in selling these goods on the plan you do for they surely talk for themselves. I bought a new sprayer of the largest capacity this spring, and I think these nozzles have increased its efficiency at least 25 per cent. They set a pace that is hard to follow. You will hear from me again as I need supplies. Thanking you, I am, Yours truly, L. E. KEELER, Payette, Idaho, Apr. 27, '12.

For One Dollar we will mail you Two Nozzles

Send money order, Chicago draft, or currency. If personal check is sent, add 10 cents for exchange.

Also! Most high grade outfit are now equipped with the

Crown Relief Valve

If your outfit hasn't one, send \$4.00 for one prepaid.

Crown Specialty Co.
1629 Washington Blvd.
CHICAGO

Codling Moth Control in the Northwest

By S. W. Foster, Entomologist and Manager Insecticide Department General Chemical

Company, San Francisco, California.

So much has been written about the codling moth during the last decade and so many speeches made on this subject one would seem justified in concluding control methods should be so well-known and so thoroughly practiced that further discussion of the subject was unnecessary. This year's experience, however, would indicate that the codling-moth family is a very large and exceedingly live one, and a foe well worth our best

efforts to combat. Many fruitgrowers of the Northwest have been sorely disappointed this year. It has not been pleasant to see such a high percentage of apples go to the cull pile, especially when the crop was short and prices, for marketable fruit, better than any time for three years past. This disappointment is by no means confined to the fruitgrower, but affects every person who has the welfare of this country at heart and either directly or indirectly affects every industry of this large section. Manufacturers of any commodity, whether it be spray materials, farm machinery, shoes, automobiles or what not, want the fruitgrower and farmer to obtain adequate returns for his produce. These returns judiciously applied toward producing more and better fruit and other farm crops mean greater prosperity to every section. If this loss results in more careful work in the future, and better practice in every detail of control operations, this year's experience will be of value, for it is seldom that the wise and successful man makes the same mistake twice.

Many people are studying the apple problem from different angles. You have marketing experts, efficient salesmen, good graders, many of you know your soil and climate and are adept in cultivation and pruning; then why such woeful failure in some cases to properly control the worms? An extensive trip throughout the apple sections of the Pacific Northwest this fall convinced me that the one main cause above everything else was the failure, by the fruitgrower, from whatever may have been the cause; to properly meet conditions as these conditions actually existed in each locality. Every orchard I saw that showed a high percentage of wormy fruit showed very little, if any, arsenate of lead on the fruit or foliage in late August to early September. It seems to be human nature among all of us that after considerable experience with some special line, if we meet with any degree of success, we begin to think

that question solved for all time to come, and therefore begin to neglect the more important, necessary operations.

All forms of insect life are fighting continually for existence and the perpetuation of the species. Abundance of suitable food, favorable surroundings and climatic conditions, the absence of natural enemies and scarcity of or laxness in artificial methods of control all tend to allow a great increase in the numbers of any pest.

Wanted Position as manager of Orchard or Farming Proposition. Have had experience in Apple, Cherry, Prune and small fruit growing in both irrigated and non-irrigated sections. Experienced in general farming and understand prune drying. Graduate of Oregon Agricultural College. Can give satisfactory recommendations upon request. Address R.E.S., care "Better Fruit," Hood River, Or.

Hood River Pruning & Grafting Wax

READY FOR USE

Without Heating

1-lb. Can, postpaid, 60c

Made by

A. NIEHANS, Hood River, Oregon, R 2

Walnuts Are Dollars

Plant a Walnut Grove that will grow into dollars while you sleep. The Vrooman Franquette bears at three years and sells for 25 cents per pound—is smaller than an apple and sells for more money. Get in with the tide and get rich. At forty feet apart it only takes 28 trees to the acre. Is cheaper than an apple orchard to plant and makes your land more valuable.

True Vrooman Franquette
Walnuts Trees at Bargain Prices
at

Mira-Monte Nursery
SAN JOSE, CAL.

The Spray That Sticks

ADHESO

REG. U. S. PAT. OFF.

Insecticide—Tonic—Fungicide

WHEN other spray materials fail to do their work, because rain washes them off, "ADHESO" STICKS, killing the Codling Moth and PREVENTING the SCAB, because it stays where it is needed and does not wash off into the ground.

"ADHESO" GAVE 99% CLEAN FRUIT THIS YEAR, the worst in fifteen years for Codling Moth and Scab.

Write for details and means for making the STANDARD TEST FOR ADHESION.

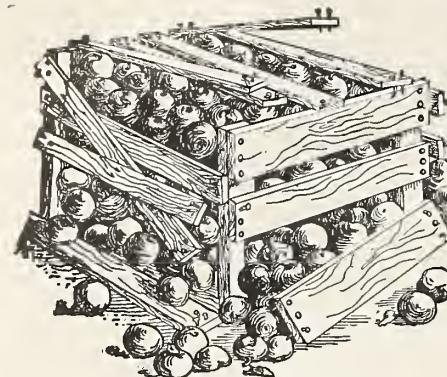
"Triangle" Brand Arsenate of Lead

The reason our Arsenate of Lead costs more than others, was shown this year. Ask any grower who used it. He DID NOT LOSE 50% to 75% by WORMY APPLES.

It is not the COST PER POUND but the COST PER SPRAY TANK and RESULTS OBTAINED that count.

Ansbacher Insecticide Co., Inc.

527 Fifth Ave., NEW YORK CITY



BEFORE using Cement Coated Nails

Western Cement Coated Nails for Western Growers

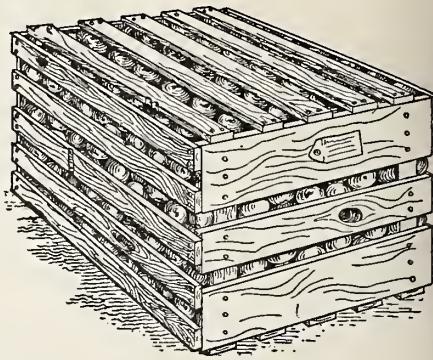
Our Cement Coated Nails are always of uniform length, gauge, head and count. Especially adapted to the manufacture of fruit boxes and crates. In brief, they are the Best on the Market.

Write for Growers' testimonials.

Colorado Fuel & Iron Co.

DENVER, COLORADO

Pacific Coast Sales Offices
Portland, Spokane, San Francisco
Los Angeles

AFTER use of C. F. & I. Co.'s
Cement Coated Nails.

In some sections last year (1914) the apple crop was heavy, prices low and far less than the usual care given the orchards, especially insect-control measures. Apples were not picked as closely as usual, some were left on the trees, more on the ground, wormy apples were thrown away with little thought of loss. The season was more open, fair and reasonably warm till late fall, many worms hatching from eggs deposited even as late as harvest time found sufficient food for maturity, all of which resulted in a heavy carry-

over of worms and a more general infestation of fruit this past spring than had occurred for some time previous. Weather conditions then interfered with the routine spray operation, in some cases the application was greatly delayed or omitted and sometimes heavy rains followed soon after the spray was applied. Only very few growers took the precaution to repeat the application under these conditions. Those who did so have been repaid many times over. Also there was no regularity in broods of worms. In

fact there was little distinction or division between the broods this past summer; worms hatched almost every day from the beginning of the first brood until the end of the last and entered the fruit unless killed. Fewer worms entered the fruit through the calyx and more through the side than is apparently the case during normal years. It was therefore important that the fruit and foliage be covered with poison all the time. Fruitgrowers should fully appreciate by this time the value of the first or calyx spray, for we know that most of the first-brood worms and a considerable percentage of the later broods enter through the calyx.

It is very natural for the grower to attribute the failure or lack of success to the material used and often to claim it was faulty. He is often encouraged from one source or another to do this. Those people, however, should remember that manufacturers of insecticides for interstate shipment must make them so they will meet the requirements of the federal insecticide and fungicide law. This law governs the standard so far as the contents or analysis of the spray material is concerned. Also some states are now undertaking to make all local manufacturers meet these same or similar requirements.



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From a farm hand at \$25 a month to a tree expert at \$3,000 a year—from monotonous grind to a fascinating, healthful, respected profession—that is the rise of the man pictured here, P. E. Hudson, Jamaica, L.I., N.Y. Through the Davey course of training by mail hundreds of young men, like Hudson, have improved their condition in life. *You have an equal chance.* A few months study, at home, in your spare time, will fit you for any of the following positions—Tree Surgery, City Forestry, Park Superintendent, Fruit Growing, Tree Surgery and Fruit Growing, City Tree Expert, Forestry. These fields are uncrowded; you will have more demands for your services than you can fill. Write today for book, "Adventures in Success," and tell us which of the professions listed above especially appeals to you.

The Davey Institute of Tree Surgery, 435 Oak St., Kent, O.

Prune and Grafted Walnut Trees

Also Apples, Pears, Peaches, Plums, Apricots, Cherries, Small Fruit Plants, Etc.

Can be bought now at Greatly Reduced Prices

Write today submitting your want list for quotations.

LAFAYETTE NURSERY CO., LAFAYETTE, OREGON

Pear Trees for Sale

I have a large lot to offer of the following sorts: **Bartlett, Anjou, Bosc, Winter Nelis, B. Clairgeau, Howell, Comice** and other varieties. All budded trees, one and two years old.

I also have **Plum and Prune Trees** budded on plum, and budded berry-bearing and seedling **Holly Trees** from 2 to 5 feet. Also **Mazzard Cherry** and **Marianna Plum** stocks for nursery planting.

Good stock at very low prices to Nurserymen, Dealers and Planters.

JAMES W. STEPHENS
Kelso, Washington

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It gives you a high grade quick selling product at a minimum cost. It makes a clean and natural tasting product. Dehydrated fruits and vegetables have been approved by the U. S. Government, while desiccated, dried and evaporated products have been rejected. There is but one Dehydrator manufactured in the West and it is the best By-Product machine ever devised. It is adapted to the individual grower, as it can be constructed to meet any and all requirements. It is fully covered by U. S. patents. Therefore, you are protected in its use.

The manufacturers of this Dehydrator have recently patented new and improved automatic labor-saving preparatory machinery which will further reduce the present low cost for the production of this product.

For new descriptive booklet address

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A very complete line of
Fruit and Ornamental Trees, Shrubs, Vines, Etc.
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Clean Coast Grown Seedlings
Oregon Champion Gooseberries and
Perfection Currants
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160 Pages, Illustrated Write for it Today!

Tells best varieties, season of ripening, growing habits, most satisfactory kinds for your section, which are best for money-makers—apple, pear, peach, plum, cherry, grape, bush fruits, strawberries, roses, ornamentals, etc. Over 200 photographs. Book is worth \$1.00, but SENT FREE by return mail if you write today.

\$1,420 From 1 Acre of J.H. Hale Peaches

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Our Ozark Mountain, Stark City soil produces unusually heavy, strong, wide-spreading roots. These roots give the trees a quicker start, healthy, thrifty growth and bring them into bearing a year and sometimes two years sooner than ordinary-rooted trees.

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Our catalog is our only salesman. You save all agents' commissions and expenses. Get your trees direct from nursery—no rehandling. Our "3,000 Mile Package" ensures safe arrival anywhere. Every tree or plant **doubly guaranteed true to name**. We have customers in every state—some in your neighborhood. Get ready for early planting—write for the book today.

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GOOD AS CAN BE GROWN
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I will give a lot of new sorts free with every order I fill. Buy and test. Return if not O.K.—money refunded.

Big Catalog FREE
Over 700 illustrations of vegetables and flowers. Send yours and your neighbors' addresses.

R. H. SHUMWAY, Rockford, Ill.

The real reason for lack of proper results can usually be found in the failure to properly meet the local conditions. The increasing amount of fruit grown in any section; the older, the taller, the larger and thicker the trees become the more worms and other pests will appear, unless extra efforts and precautions are intelligently applied to offset this natural increase. It is by no means as easy to fill every calyx cup or cover every apple with spray on a large, thick tree as it is to effectively do so on a small, easily accessible tree. Furthermore, the worms find more and better hiding places on the larger old trees, and a greater percentage of worms find protection during the pupation or transformation period. Too many growers were inclined to consider the codling-moth problem solved and did not give it sufficient attention.

My purpose in calling attention to these possible omissions is to point out the necessity of more and better care and more thorough work to meet any changed condition that may arise. Make more applications if necessary, but in any case protect your investment to give the greatest possible return. If an unexpected rain destroys the value of an application of spray repeat the spraying at once, and if long-continued rain or other conditions arise to favor the pests and to work against the crop, do an extra amount of work along the proper line to overcome this. Some are inclined to balk at the expense of the operation, but when we know that an orchard can be sprayed six times a year, once in the dormant state and five times during the growing season, allowing a combination of fungicide and insecticide for at least three sprayings at a total cost for the entire operation of five cents per box when you have 400 boxes per acre, of ten cents per box when you have only 200 boxes per acre, we cannot give nearly the sympathy to the man who yells expense as we do give admiration and encouragement to the man who says he has invested five cents per box or ten cents per box, as the case may be, to insure all of his fruit to be clean, marketable and is a credit to himself and to his community.

There is no economic reason why the Northwest, if properly handled, should not get an average of \$1.00 per box for most varieties of apples f.o.b. shipping station. By omitting one spray during the season, with a crop of 400 boxes per acre you may save one and one-half cents per box, or \$6.00 per acre, and lose 10 per cent of your crop, or \$40.00 per acre on your investment. Add to this your extra grading and packing expenses and you will have even a greater difference, which shows all the more proof that the greatest of care should be intelligently exercised to protect your investment against such loss and not consider money so paid as a tax, but as premium paid to protect the capital invested. In the last analysis that is the only way to consider any money put

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Lents, Oregon

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Growers of a general line of nursery stock. A good clean stock of Italian Prunes and 2-year Bartlett Pears at special prices. Also a good line of Evergreens and Ornamental Trees and Shrubs.

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WAGNER'S IMPROVED WINTER RHUBARB
If planted NOW you should derive good results. Also BERRIES and small fruit.
Write for prices. **J. B. WAGNER, Rhubarb, Berry and Cactus Specialist, Pasadena, Cal.**

Walnuts—Grafted Walnuts

Mayette Franquette Concord

Best Three tried out and found practically blight-proof. All of best and largest strain. Bear after first year.

Big money in Walnut growing.
Write quick for our LOW PRICES.

TABLE GROVE NURSERIES
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True-to-Name Nursery

**GALLIGAN BROS.
Proprietors**

HOOD RIVER, OREGON DUFUR, OREGON

Growers of high grade nursery stock, guaranteed true-to-name. Breeders and importers of purebred Big Type Poland-China Hogs. Service boars, bred gilts and weanling pigs for sale.

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Gearless Improved Standard
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Drills through any formation. Five years ahead of any other. Has record of drilling 130 feet and driving casing in 9 hours. Another record where 100 feet was drilled on 2½ gallons distillate at 90° per gallon. One man can operate. Electrically equipped for running nights. Fishing job. Engine ignition. Catalogue W-8.
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Mulconroy Flexible Metallic Spray Hose

LIGHT
Weighs 6 oz. to foot.

STRONG
Tested to 2,000 lbs.

FLEXIBLE
Will coil in 3 in. circle.

**Can't Kink, Twist,
Burst, Collapse
or Chafe**

Protected against kinking, hard knocks, sharp turns, dragging over rough surfaces and other outside abuse. Tube especially compounded to resist the action of the oily and corrosive liquids and powders used in spraying.

Full capacity always, because **HOSE CANNOT KINK**.

When equipped with Mulconroy High Pressure Couplings, it makes **THE STRONGEST HOSE MADE**. Ask for No. 47 Folder.

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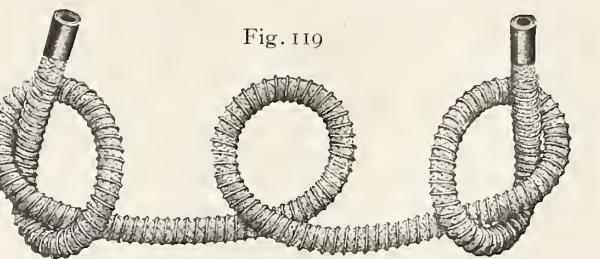


Fig. 119

Ridley, Houlding & Co.

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1.—We Specialize in Apples

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Most Desirably Located. In the Center of Shopping and Theatre District
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GEO. C. OBER, Manager

into an orchard venture. Look upon it as an investment or else to protect the investment you already have. We must look farther ahead and give full consideration to what the results will be at harvest, or selling time; that is, what returns the investment will yield, rather than take into account only the cost of the material you use and the labor to apply it. It is rare that the omission of one or two applications of spray, in order to save a small expense early in the year, does not result in a far greater loss at the end of the season. It would be folly to spend \$15.00 per acre on orchard spraying to give 85 per cent clean fruit and stop there when \$5.00 per acre added to this would give you 98 per cent clean fruit.

There has been much complaint this year as to the enormous number of side worms. Many growers report very few apples lost from calyx worms, but in some cases one-third of the crop was rendered unmarketable by injury from side worms. No single explanation could cover all the conditions in all sections which might tend to produce this state of affairs. It is generally conceded that in any section where conditions will permit three broods of worms per year that each worm maturing from the first brood will mean, in the absence of control measures, at least 600 worms before the season is over. Also most of the apples injured by calyx worms early in the season will fall from the trees before maturing. Furthermore, if the calyx cup is well filled with arsenate of lead it will usually remain effective throughout the season, killing all worms that attempt to enter the fruit at this place. It is rare that side worms are found early in the season, largely because so few worms are present at that time as compared with the enormous increase later in the year. While under normal conditions 80 to 85 per cent of the first-brood worms may enter through the calyx cup only some 10 to 20 per cent of the later broods of worms on unsprayed trees enter the fruit at that point, while the other 80 to 90 per cent go through the side. The principal reason, therefore, during normal seasons, for the great number of side worms late in the season is very largely because of the number of worms present to infest the fruit. In 1915 it seems evident that fewer of the first-brood worms entered the fruit through the calyx and more through the side than is normally the case. Due to cold, wet weather the first brood (the worms hatching from eggs deposited by moths emerging from over-wintering larvae) was delayed and strung out over a longer period of time; the apples were larger and smoother by the time the later appearing first-brood worms had emerged, and these worms found easy access through the side of the apples. The remedy is more careful and more persistent, thorough spraying, kept up continually through good years and bad, to keep the number of worms sufficiently reduced to prevent the appearance in great numbers at any time.

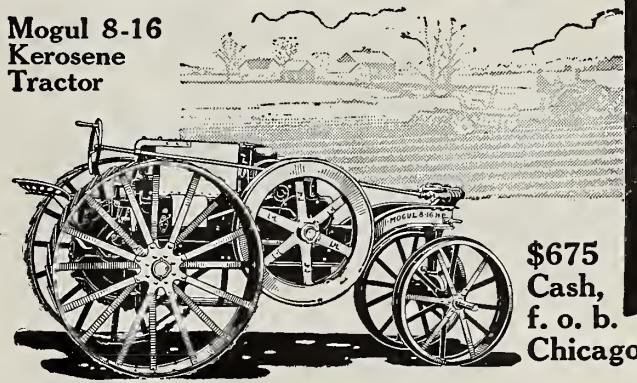
Do not get a mistaken idea of economy by saving material early in the season at so heavy a cost at harvest time. Use enough poison, properly mixed and thoroughly applied to every part of the trees at the right time to catch all worms, both early and late appearing, remembering that the codling-moth eggs are deposited both on the fruit and foliage; therefore at each application thoroughly cover with a thin film of spray every leaf and every apple on the tree. Watch the trees and fruit more closely early in the season, and if any worms or wormy apples can be found, or if weather conditions are such as to favor the development of worms or cause irregularity of broods and at the same time work against the effectiveness of or interfere with the timing of the spray application, make an extra effort and do extra work to meet the unusual conditions that may arise at any time or in any locality and which do arise at some time in every section.

Standard arsenate of lead paste will positively control the codling moth on any variety of apples in any section, if properly applied, to meet the actual conditions that exist. Work that is successful one year may not necessarily be so next year if followed out in the same way, but under different conditions. We cannot lay the fault for lack of success to arsenate of lead, for it is the best-suited poison, all things considered, that can be safely used on apple trees to control codling moth. Normally three thorough applications, properly timed, are sufficient to control codling moth, but it may happen that because of peculiar conditions four or even five applications will be a better investment than three.

Final Suggestions.—Spray the trees before the calyx cups close and fill every calyx with poison. This calyx spray may require two applications on some varieties of trees, but in any case it must be thoroughly done; a drenching is really necessary and the nozzles should be held in such position that the spray will be directed straight into the open end of the calyx. Subsequent applications are for the purpose of covering the surface of the fruit and the foliage also; for many eggs are deposited on the leaves and many of the worms hatching from these eggs can be killed before they get to the fruit. When you have a light crop do not make the mistake of merely picking out the fruit and spraying the few apples that may be there, but if you do any spraying during such years cover the foliage as well as the fruit. Do not make these summer applications too light, neither should they be drenching sprays, but every apple should be completely covered. For these applications use only nozzles that will make a fine mist and have sufficient pressure for good work. Spray the fruit and foliage on the inside of the tree first, holding the nozzle near the center of the tree, directing the spray outward in such way as to cover that side of the fruit toward the center

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Mogul 8-16
Kerosene
Tractor



\$675
Cash,
f. o. b.
Chicago

AT the price, the **Mogul 8-16 tractor** deserves the careful attention of all progressive farmers.

It won a Grand Prize at both San Francisco and San Diego Expositions. That proves its class.

It can be used with profit on small farms, doing all the hardest work of the horses, and much that horses cannot do. That proves its usefulness.

It better the plowing and other work of seed bed preparation, while reducing its cost, and—

It burns kerosene under all conditions. This one reason is enough to sell a **Mogul 8-16**, because, on the average, gasoline costs about 65 per cent more than kerosene. That proves its economy.

It costs about half its equivalent in horse flesh.

The price is \$675 cash, f. o. b. Chicago.

A tractor so good, so useful on farms of all sizes, so economical, and at such a price, deserves a thorough investigation. Your local dealer should be able to show you a **Mogul 8-16**. If he can't, write to us. We'll see that you get a look at it, and we will also send you our new book, "Tractor Power vs. Horse Power."

International Harvester Company of America
(INCORPORATED)

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THE LARGEST AND MOST SUCCESSFUL ORCHARD PROJECT
IN THE ENTIRE WEST

7,000 acres planted to winter apples. Gravity irrigation. Located 22 miles north of Spokane, Washington, directly on the railroad. We plant and give four years' care to every orchard tract sold. \$125, first payment, secures 5 acres; \$250, first payment, secures 10 acres; balance monthly.

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Arcadia Orchards Company
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(EXTRA FANCY)

“RED RIBBON”

(FANCY)

Quality Brands of Yakima Apples

When ordering apples specify Blue Ribbon Brand and be assured of the best the market affords. All apples packed under our personal supervision and inspection.

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AND PRICES

Yakima County Horticultural Union

FRED EBERLE, Manager

NORTH YAKIMA, WASHINGTON

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We offer extra fine trees with big roots and heavy bodies at bed-rock prices. Write today for samples of grades and prices. They are going fast.

Other first-class nursery stock for sale at low prices.

BENEDICT NURSERY CO., 185 E. 87th Street N., Portland, Oregon

Lime Sulphur Lead Arsenate Bordeaux Paste Spra-Sulphur

The most serious pests and diseases doing the most damage to trees in the Northwest are San Jose Scale and Anthracnose. The ones doing the most damage to crops and causing a loss of millions annually to fruit growers, are Codling Moth and Scab.

Growers Must Have Sprays that are Efficient

We make the above sprays of the highest degree of efficiency and sell at reasonable prices.

Clean crops are necessary if you expect to sell your apples at good prices.

Use Our Sprays and Grow Clean Fruit

Factory at Clackamas, Oregon.
New factory being built at Hood River, Oregon.

For the present direct all correspondence to

Oregon Arsenical Spray Co.
CLACKAMAS, OREGON

of the tree, then finish by spraying from the outside of the tree and go all the way around the tree. Do not attempt to spray large trees from only two sides, but make a complete circle and exercise special care wherever an apple touches another apple or a leaf or limb. When worms are plentiful or indications are they likely will be so, spray the trees often enough to keep the surface of the fruit covered with poison to within a few weeks of harvest time. In all spraying for codling-moth control, use arsenate of lead paste containing 15 per cent arsenic oxide at the rate of 4 pounds or its equivalent, if powder is used, to each 100 gallons of spray.

Future of the Fruit Industry of the Northwest

By W. S. Thornber, Director of Extension Department, Washington State College.

IT seems like a great deal of presumption on my part today to undertake to talk to a group of fruitmen like yourselves upon the future of our industry after listening, as we have, to the many fine addresses by practical men as well as college men upon the life cycles of bugs and bees and rust and disease, but nevertheless I feel that at just this time it is wise to stop and consider rather carefully just what the future is going to mean for many of we fruit producers, lest we now make a more serious mistake in pulling up our apple orchards than we made eight or ten years ago in the planting of them. It is a remarkable fact, nevertheless it is emphatically true, that almost everything works in cycles or waves. During a certain period farmers everywhere run almost exclusively to stock, while during another it is grain and so on; first one fad and then another until we go bankrupt buying machinery or equipment to fit the numerous changes that project themselves upon us.

The Present Condition.—For the sake of better understanding our problem let us critically analyze our real conditions as fruitgrowers, and I wonder if the conditions of one of our most successful valleys would not represent the universal conditions of fruitdom in the Northwest? If so, here they are: Seventy-five per cent of the growers are dissatisfied because they have made no money during the last three years. But what class of people has made anything beyond a good living during the past four or even five years. Ninety-five per cent of the growers would gladly sell their holdings now for considerably less than they paid for them and willingly lose their time and interest in the bargain. Again, this is not remarkable when we come to realize that it is an almost universal rule to many people that something else always looks better than what they are doing. Hence the desire to change. Sixty-five per cent of the orchard area of the valley during the past two years has been so seriously neglected that it is a question in my mind now whether or not it

can ever be brought back to profitable fruit production again. If this, then, is the condition of one of the best valleys of the Northwest, what must we expect of some of the less favorable areas?

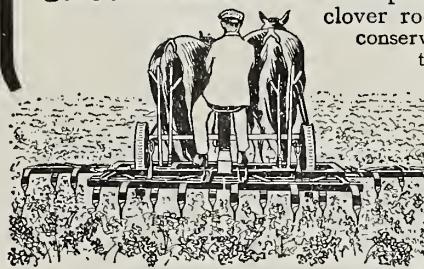
Let us stop for just a moment and learn the conditions of one of the less favored fruit areas of the West. I believe I betray no one's confidence when I say that less than a week ago one of the largest orchard operators on non-irrigated land said to me: "The last three years has conclusively taught us that it is folly for us to continue to endeavor to compete with the favored districts of the West. It is a losing game, for when we do produce fruit less than six per cent of it will pass as extra fancy, as compared with from fifty to as high even as seventy per cent in the favored areas, and while our land is cheaper our returns are so much lower that our losses are even greater." This party has already pulled 300 acres and will pull another 160 acres this year. Converting, as he is, all of his orchards into wheat and alfalfa land. I am of the opinion that when a new census of the orchard areas of the Pacific Northwest shall be made that instead of it representing a half-million acres that less than a quarter of a million will more than cover it, and even this will be materially reduced if owners do not use reasonably sane judgment in their haste to get from one crop to another.

The Causes for These Conditions.—A person needs only to visit one of the overdeveloped districts of the West to learn fairly accurately why thousands of acres of land was planted to orchards that should never have been planted. The story is a repetition of the "Razor Seller's Story." They were never expected to bear fruit. No one ever intended that they should, nor was there ever any provisions made for the fruit should there ever be any. The problem resolves itself into overzealous real estate boosting without sufficient knowledge or honest judgment of what constitutes good orchard lands and climates. Very briefly, we may easily sum up the factors that brought the fruit industry of the West to the conditions that now prevail, and in doing so we likewise portray the conditions of the East, that materially assisted in doing for the East what we have done in the West: (1) Unreasonable boosting of orchard and orchard lands. (2) Misrepresentation of the possible returns of orchard lands. (3) The keen American desire to make a change. (4) The inborn desire to speculate. (5) The cutting up of orchard properties into such small units that it is almost impossible for the average family to make a living upon the given area.

Were I considering the most serious factor entering into the problem as it now stands, I would certainly name the size of unit as the factor because of the intense hardships it is bringing to many because they cannot sufficiently diversify to make orcharding successful. If ten acres had been used as the

Forkner Alfalfa Cultivator

Stirs and aerates the soil—uproots grass and weeds—destroys clover root weevil—leaves dirt mulch and conserves moisture without cutting or injuring the alfalfa. It will



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is a tree by its fruit; equally well known is a bank by its dealings. Good fruit means good revenue and the place to keep the revenue is in this strong state bank, well known for its security and fair dealings.

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TOP DRESS all your Crops with **Nitrate of Soda** alone, no matter what other fertilizers you may have used. 100 pounds to the acre for seeded, and 200 pounds to the acre for cultivated crops will do the work. The increase will yield large profits over the cost.

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WILLIAM S. MYERS, Director
25 Madison Avenue, New York

smallest possible unit and even twenty and forty acres been planted, half to fruit and the balance to alfalfa or other crops, the conditions of the fruitgrowers of the West today would be far different to what they are now. This would have given them an opportunity to diversify and at least make a comfortable, independent living from their tracts. Closely associated with this factor has been the lack of knowledge that would have given the grower an advantage in doing something practical, something that would have brought in a money return rather than an experience without money value.

We hear from many sources of the losses of hard-working people who invested their small savings in Western orchards, and all true Westerners honestly deplore this, but we rarely hear of the losses of Eastern people who invested their savings in mining properties, and yet from one of the largest financial centers of the Middle West ten dollars went out for poor mining stock for every dollar that went out for Western orchards. We hear no complaint from these losers because nobody sympathizes with a person who loses in mining stock. Just why there should be a difference I do not know, unless one is looked upon as a form of gambling and the other is not. And, of course, a gambler naturally expects to lose a part of the time at any rate.

Fruit Growing Compared With Other Agricultural Industries.—Ever since man became engaged in agricultural pursuits there have been fluctuations from year to year in the prices of the various commodities, and so long as natural conditions make it impossible for the farmer folk to produce uniformly the same quantity each year these fluctuations will continue to occur. Anyone familiar at all with the prices of farm commodities cannot help but see this same condition in hogs, cattle, horses, corn, wheat and barley this year, and the producers of these crops have lost as much this year as the apple producers lost last year; and yet we hear very little complaint from them. They take their losses philosophically and know that they cannot win every year, but that their day is surely coming again. Just recently I saw a combination fruitgrower and hog producer sell his extra fancy McIntosh Reds at \$2.00 per box net to him at his orchard gate, and his extra fancy Duroc Reds at \$4.25 per hundred, delivered at the stock yards eight miles from his orchard. Now, if you growers know anything about hogs at all you know that he did not make anything on his Duroc Reds if he had to feed them any grain at all, and I can assure you he did. My purpose in making these few comparisons is a concrete one. I simply desire to show you that all lines of agriculture have advantages as well as disadvantages, and the men who are sure to lose the most are the ones who are so burdened with debt or are financially unable to take the strain of small profits or even losses for any period of time.

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Fruit growing is so closely allied to the other lines of agriculture that the same general principles of success and failure prevail, and probably the most important one of these principles or factors is the consideration of the profits of the industry for a period of years. There is no known agricultural industry of any kind that permits its operators to make a fortune in a year, or for that matter every year. However, any one of the numerous lines carefully and religiously followed up for a period of ten years shows net profits and good returns, and I believe that this is all we can expect of the fruit industry. Do not misunderstand me, for there are thousands of acres of land planted to fruit that can never under any circumstances pay interest on the investment, taxes, etc., and at the same time give a return to the owner. Such lands were never intended for fruit purposes and the sooner the owner or operator realizes this and removes the trees the better financially will it be for the owners. Nor is the land at fault alone in all cases, for there are other factors that must be taken into consideration, and these are some of them: (1) Proper profitable varieties adapted to the local conditions. (2) A system of planting followed out in such a manner as to make fruit production under those conditions profitable. (3) An orchard management that shall get the best from the trees annually. I refer here especially to pruning and irrigation, and personally believe that more is lost annually through lack of this knowledge than because of any other single factor in fruit production.

A factor that many people seemed to have lost sight of is that the great European struggle now in progress has practically destroyed the best orchards of Europe. Thousands of acres of orchards and vineyards are completely obliterated, and after the struggle has ceased it will require twenty years to replace these lands and make them as productive of fruit as they were before the war. As a fruitgrower, I have come to realize that the industry here in the Pacific Northwest is subject to the same influences that affect any other branch of agriculture, and that we must expect and be prepared for just such conditions as we have had to contend with during the past four or five years, and the best way to prepare for these conditions is to diversify in such a manner that our orchards can be maintained at their best, and be made to pay all operating expenses of the orchard and living expenses of the home annually from the soil. This is not the time for big exploitations and non-producing improvements, but it is the time for sound judgment and safe, sane management that will give returns. Just as in other lines, the man who can best use his head will best succeed, and those who fail will fail because of lack of knowledge and management.

The Field of Diversification.—Just what is best for an orchardist to com-



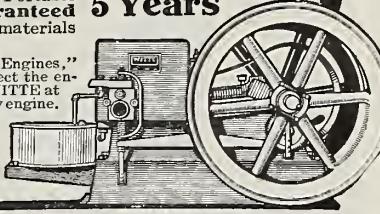
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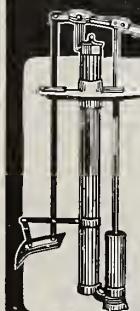


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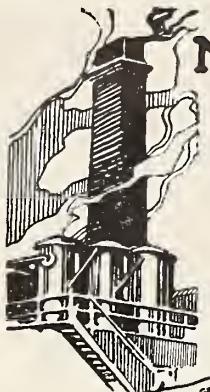
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bine with his fruit work as a side line will depend upon certain factors: (1) The orchardist himself, his likes and dislikes. (2) The local conditions, soil, climate, market, etc. (3) The labor problem, home help, city help. (4) The size of his orchard and age of the trees.

Some people can do more on two acres than others can do on ten; for example, the man who grows fancy head lettuce may succeed better with half an acre than he could with ten acres, while the man who grows corn needs more land, but even he had better grow one hundred bushels per acre on five acres than sixty bushels per acre on ten acres; and thus we could continue the possibilities, but the keynote must be intensification even to the extreme, because our land is so valuable and so full of possibilities that it does not pay to half farm any of it. In the selection of inter-crops it is well to produce only such crops as have two or more possibilities. A concrete example may here be shown in the production of seed corn. The best select ears of the field may be saved for seed, the poorer ears used for hog feed and the stalks fed to the cows or horses; and instead of producing just hogs it usually pays to produce hogs suitable for breeding purposes, which usually costs no more to produce than common or grade stock. A few well-chosen lines, closely united, are better than a lot of poorly-selected, ill-fitting combinations.

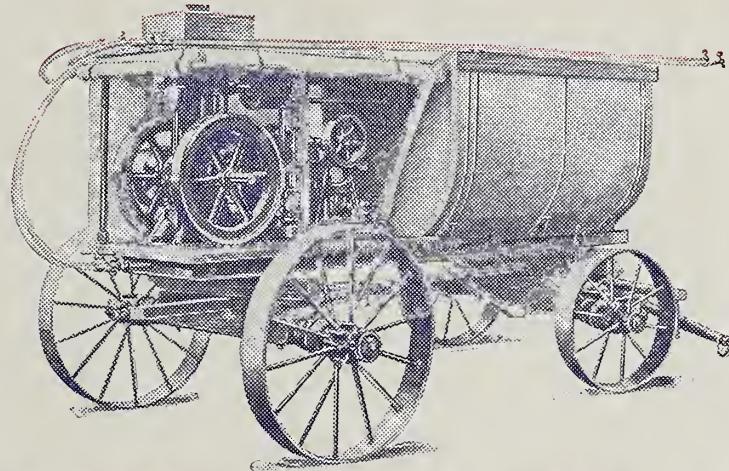
The following combinations have been found to work out very well: (1) Fruit, alfalfa and dairy cows. (2) Fruit, alfalfa and hogs. (3) Fruit, carrots and dairy cows or hogs. (4) Fruit, corn, dairy cows or hogs. (5) Fruit, poultry and alfalfa. (6) Fruit, and sunflowers, or head lettuce, or potatoes, or tomatoes. The livestock combinations with the orchard have a fertilizer value rarely taken into consideration by the laymen, nevertheless it is a real value that should always be taken into account in permanent agriculture.

What, then, is the future of the fruit industry? Nothing for the man who quits. There is only one thing for us to do and that is to stay with the game. If our factors are not right, either make them right or change the policy. Some of the eliminating factors of the average fruitgrowers are: (a) Unsuitability of the owner and operator. (b) Undesirable varieties. (c) Orchards on unsuitable lands. (d) Orcharding in unsuitable climates. (e) In isolated districts. (f) Poor planting plan, making economic management impossible. (g) Orchard area too much limited for diversification.

In conclusion will say that just as soon as every orchard farm is compelled to support its hogs, dairy cows, horses and finally its owner, the fruit problem will be solved. I am more optimistic today over the fruit industry than I have been for years, because I know that there are thousands of acres of land planted to trees now in the Pacific Northwest whose fruit will never compete with the orchards that are now receiving good care.

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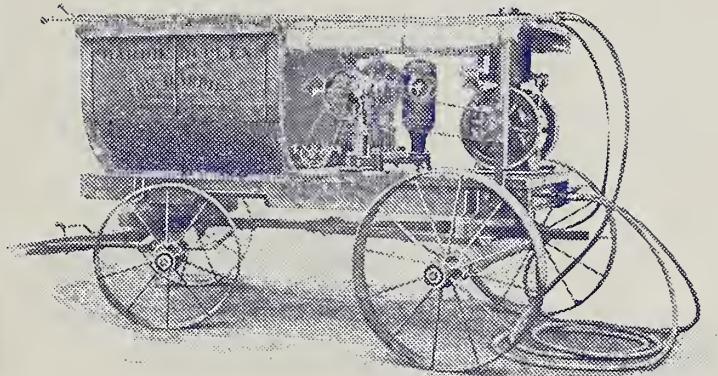
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